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Rapport manuscrit canadien des sciences halieutiques et aquatiques

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2007

Distributions of Freshwater and Anadromous Fishes from the Mainland Northwest Territories, Canada

by

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ABSTRACT

Sawatzky, C.D., Michalak, D., Reist, J.D., Carmichael, T.J., Mandrak, N.E., and Heuring, L.G. 2007. Distributions of freshwater and anadromous fishes from the mainland Northwest Territories, Canada. Can. Manuscr. Rep. Fish. Aquat. Sci. 2793: xiv + 239 p.

The Northwest Territories mainland distributions of fifty-four fish species are depicted as sample locations on a series of maps. Distribution information is compiled and synthesized from all formats of literature records, museum samples, and Fisheries and Oceans Canada sample data, and merged with previously published distributions. Distribution maps are grouped by family and species and, where appropriate, species are taxonomically updated. This report provides the most up to date information available on anadromous and freshwater fish distributions in the mainland Northwest Territories.

RÉSUMÉ

Sawatzky, C.D., Michalak, D., Reist, J.D., Carmichael, T.J., Mandrak, N.E., and Heuring, L.G. 2007. Distributions of freshwater and anadromous fishes from the mainland Northwest Territories, Canada. Can. Manuscr. Rep. Fish. Aquat. Sci. 2793: xiv + 239 p.

La répartition des cinquante-quatre espèces de poissons dans la partie continentale des Territoires du Nord-Ouest est représentée en tant qu'emplacement d'échantillonnage sur une série de cartes. Les renseignements de la répartition sont compilés et synthétisés à partir de tous les formats de documents, d'échantillons de musée, des données provenant des échantillons de Pêches et Océans Canada, et sont incorporés à la répartition publiée précédemment. Les cartes de répartition sont regroupées par famille et espèce et, le cas échéant, les espèces étaient mises à jour de manière taxonomique. Ce rapport offre les renseignements disponibles les plus à jour sur la répartition de poissons anadromes et d'eau douce dans la partie continentale des Territoires du Nord-Ouest.

INTRODUCTION

Distributional information available for fishes found in northern Canadian waters is widely scattered and often not generally available. Furthermore, syntheses of such information are more than 25 years old (*e.g.*, Scott and Crossman 1973). The absence of up-to-date information limits all aspects of environmental and resource management. This is especially troublesome for areas undergoing rapid development such as the Mackenzie River valley of the Northwest Territories.

This report updates the taxonomy of the freshwater and anadromous fishes present in this area and provides updated distribution maps for fifty-four freshwater and anadromous fish species located in the mainland fresh waters of the Northwest Territories, Canada. Outlines of distributions inferred from maps provided in previous works (*i.e.*, McPhail and Lindsey (1970), Scott and Crossman (1973), and Lee et al. (1980)) are used as the starting base. This report consolidates, as point distributions and as a final revised distributional boundary, a variety of data including museum specimens, published, unpublished and archival data, personal communications, as well as internet searches.

These maps are intended for researchers, fisheries and habitat managers, and students studying ecology, systematics, biogeography, and environmental assessment of fishes and their habitats in this area. Although the maps are as comprehensive as possible at this time, as new information becomes available the boundaries may change. Information gaps in the maps and issues noted in the accompanying text provide researchers an opportunity to extend the findings synthesized herein.

Families of fishes are arranged phylogenetically following Nelson et al. (2004), with scientific names organized alphabetically within families. Common names, conservation status, notes on habitat use, taxonomic issues, and distribution comments are provided where relevant for each species.

The underlying database which supports the distributions is not available for general distribution at this time due to proprietary rights and arrangements with contributing sources. The intent is to update this database regularly to provide appropriate revisions to maps as needed.

METHODS

Update of Northwest Territories Freshwater Fish Taxa

All literature sources in which specific taxonomic names were recommended for the Northwest Territories (NT) were reviewed for the validity and appropriateness of the names. The total list of these is provided in Table 1. Many were considered to be synonyms or subspecific taxonomic units within valid species. The NT taxa we considered valid are indicated in bold in Table 1. Distributions of fifty-four freshwater and anadromous fish species (or valid subspecies within such) are updated and mapped in this report. Many of these distributions have been extended and are compared to previously published distributions from McPhail and Lindsey (1970), Scott and Crossman (1973), and Lee et al. (1980). Wholly marine species have been excluded. A short narrative for each species precedes the maps and summarizes information on status, habitat, taxonomy, and distribution (see below).

Area

The area of coverage is strictly within the NT mainland (Fig. 1) and includes approximately 95% of all published records to the best of our knowledge. Occurrences in Nunavut (NU) were not actively searched, but points in waterbodies crossing the NU/NT border were included and thus may appear in Nunavut. Table 2 lists species from northern drainages in British Columbia (BC), Alberta (AB) and Saskatchewan that are not presently known from the NT but may eventually occur there due to natural and anthropogenic factors.

Mapping

An extensive literature and museum record search was conducted for records of freshwater fish in the NT. These records were entered into a Microsoft (MS) Access Arctic Fish database and mapped using ArcView 3.3. Coordinates were taken directly from the report (if provided), read from National Topographic Series (NTS) maps or, if a sampling location diagram was not provided in the report, taken from the Gazetteer of Canada: Northwest Territories (Energy, Mines, and Resources Canada 1980). In most cases, the gazetteer only provided coordinates for lake centres or river mouths, therefore coordinate precision varies.

Distribution maps were created to show spatial parameters of freshwater fish species known to exist in the NT. Mapping was conducted in three steps:

(i) Reproduce reference maps

The first step was to reproduce distribution boundaries from existing references. Three references – McPhail and Lindsey (1970), Scott and Crossman (1973), and Lee et al. (1980) – provided the initial sources of information for the boundaries. A polygon shapefile was created for each species based on the boundaries illustrated in each of those references. These were used to provide the base reference maps that precede each revised distribution map in this report. The base reference maps were combined to create one distribution boundary representative of all three references. This boundary was later modified based on our point distributions (see below).

(ii) Create point distribution maps

The second step was to map the fish occurrences determined through the literature search. Data were imported into ArcView using an SQL connection to the Access database. An event theme was added to the view to show the locations of species occurrence.

(iii) Merge reference and point distributions

The final distribution map was arrived at by overlaying the combined distribution boundary with the point map created from our database. Points which fell outside the reference boundary were verified for accuracy. The point was included if the reference proved to be reliable and the coordinates were accurate. Reliability was determined based on the existence of a specimen, photographic evidence, and/or the trustworthiness of the source, with the latter assessed qualitatively by the mapping team. Coordinates were verified by comparing the database entry to the report and/or the Gazetteer. Where the coordinate information was determined to be either erroneous or entered incorrectly into the database, the coordinates were corrected. The boundary line was then modified to include

valid occurrences. In a few instances, points considered reliable were flagged as uncertainties because they were located well beyond the known distribution areas. Sections of the boundary considered uncertain appear as a dashed line on the maps. Line styles used are depicted in Figure 2. Where valid or possibly valid distribution points occurred, the outer presumptive distribution boundary was drawn so as to include the entire drainage area within which the points occurred. If a wholly freshwater species was documented in headwaters we presumed it would occur throughout those fresh waters to the northern coast, but not in the nearshore marine waters. If an anadromous or saline-tolerant species was documented in headwaters the same presumption was applied, but presence in nearshore marine environments was not excluded. For some general distributions in NU we have reported the existing general distribution from McPhail and Lindsey (1970), Scott and Crossman (1973), and Lee et al. (1980). We recognize that these boundaries are general and verification of some of the limits of distribution shown herein is required by further field work.

ArcView 3.3 and MS Access2002 were the primary applications used to manage and display data. The mapping parameters used were: projection Lambert Conformal Conic, spheroid WGS84, central meridian -115°, reference latitude 90°, standard parallel 1 33°, and standard parallel 2 45°. Revised distribution maps (large maps) are displayed at a scale of 1:12,000,000 and base reference maps (small maps) at 1:25,000,000. Where reference maps are not presented it indicates that either that taxon was not recognized by the authors or that the species is now recognized but was previously combined into other taxa (see taxonomic comments for relevant species). To improve clarity on the general distribution maps from McPhail and Lindsey (1970), Scott and Crossman (1973), and Lee et al. (1980), and on the point distribution maps, details such as north arrows, scale bars, and latitudes and longitudes have not been included. These items can be found on Figures 1 and 2.

Sources

Literature searches were conducted using WAVES, the Fisheries and Oceans Canada libraries' catalogue (http://inter01.dfo-mpo.gc.ca/waves2/search.html), Aquatic Sciences and Fisheries Abstracts (ASFA) (http://www.csa.com/factsheets/aquclust-setc.php), the Inuvialuit Settlement Region Database (http://www.aina.ucalgary.ca/isr/), the Arctic Science and Technology Information System (ASTIS) (http://www.aina.ucalgary.ca/scripts/minisa.dll?HOME), the Hydrocarbon Impacts (HI) database (http://www.aina.ucalgary.ca/hi/), our own reference collection in the Arctic Fish Section at the Freshwater Institute in Winnipeg, references of published reports, and the internet using Google (http://www.google.com) up to early 2005. All sources were searched including published, gray, and unpublished literature. Museum records from the Canadian Museum of Nature, Royal British Columbia Museum, Royal Ontario Museum, University of Alberta Museum of Zoology, University of British Columbia Fish Collection, and the International Game Fish Association up to 2005 were also included. Several other museum collections were searched, but those that did not provide new information were not included. University of Alberta Museum of Zoology records were originally provided by the University but are now available online at http://www.europe.gbif.net/portal/index.jsp, the remainder of the records were found online at the Global Biodiversity Information

Facility (GBIF) data portal (http://www.europe.gbif.net/portal/index.jsp) and the Government of Canada Canadian Biodiversity Information Facility (CBIF) web site (http://www.cbif.gc.ca/portal/digir-toc.php). Permission was obtained from the institutions for the inclusion of their records in our database and for publication in this report. We accept responsibility for any errors or omissions.

Our database was compared to a Mackenzie Valley Pipeline database of records from the 1970s created by Margaret Friesen (pers. comm. 2006). All points from this database fell within our revised boundaries for all species, thus this database was not incorporated.

Nomenclature

Families are organized phylogenetically following Nelson et al. (2004) and scientific names within families are organized alphabetically. The names and spellings follow those of the American Fisheries Society (Nelson et al. 2004). Common names are given in English (E), French (F), Inuktitut (In), Inuvialuktun (Inv), Gwich'in (GW), North Slavey (NS), and Dogrib (DR), where available. English local names are also included. French names are from Nelson et al. (2004) unless otherwise noted. Dogrib fonts were obtained by downloading WinMac Dene Fonts Version 2.0.0.112 from http://www.denefont.tripod.com. Tavultesoft Keyman Version 5.0 was included with this download.

Conservation Status

Conservation status rankings according to the NWT Species 2000 and 2006-2010 reports, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2006), and the Canadian Endangered Species Conservation Council (2000 and 2006) are included for each species regionally (within the NT) and nationally, where applicable. Definitions of status rankings are included in the Glossary (Appendix 1).

Habitat Summaries

Habitat by life history summaries are provided for each species and reflect the amount of available information. The primary sources were Richardson et al. (2001) and Evans et al. (2002). Readers requiring more information or original sources are encouraged to consult these two references. Life history type definitions follow Richardson et al. (2001) and include:

1. Lacustrine: fish that spawn, rear, and remain in lake environments for the majority of their life cycle.
2. Adfluvial: fish that rear and remain in lacustrine environments for the majority of their life cycle, but that spawn in rivers or streams associated with lakes.
3. Riverine: fish that spawn, rear, and remain in river or stream environments for the majority of their life cycle.
4. Fluvial: fish that spawn and rear in the same section of a stream or river making only minor migratory movements throughout their life cycle.
5. Anadromous: fish that spawn in fresh water environments and migrate to marine environments for a portion of their life cycle.

Taxonomy

Taxonomic issues, such as nomenclature and species complexes, are discussed in the taxonomic comments of the summary section for relevant species.

Distribution Comments

Distribution in adjacent areas, namely the Yukon Territory (YT), Alaska, and NU, are summarized and records used to extend previously published distribution boundaries are noted.

Notes Page

To allow for facing-page comparisons of previous and present distribution maps, a notes section or page is added. This will allow the reader to personalize and update their information.

Errors, Discrepancies, and New Information

The intent of this project is to develop a 'living document' that can be easily updated and corrected in future versions. Accordingly, where users observe errors, discrepancies, or possess new or unrecorded information, the authors request such be provided in written form to Jim Reist (Freshwater Institute, 501 University Crescent, Winnipeg, MB, R3T 2N6, E-mail: Jim.Reist@dfo-mpo.gc.ca). For updates to distributions please include: an appropriate figure, water body name, sampling coordinates, date of capture, accurate and confirmed identification to species (list sources), and/or a voucher specimen (see below), as well as any other relevant information.

RESULTS

Number of Species in NT Waters

A total of 56 named taxa have been documented from NT fresh waters (Table 1). Four of these represent taxa that are presently considered invalid at the species level: (a) brook lamprey (*Lampetra appendix*) is considered to be an invalid identification of Arctic Lamprey (*L. camtschatica*), (b) Darktail Lamprey (*L. alaskensis*) is an invalid taxon also considered Arctic Lamprey, and (c) both Alaska Whitefish (*Coregonus nelsonii*) and Humpback Whitefish (*C. pidschian*), although valid as subspecific components of Lake Whitefish (*C. clupeaformis*), are submerged into the latter based upon recent genetic findings (McDermid et al. 2007). One species frequently reported in arctic fresh waters, Fourhorn Sculpin, *Myoxocephalus quadricornis*, is primarily a marine species thus is not included in the distributional maps. Thus, a total of 51 species appear to be validly present in mainland NT waters.

Of these 51 species present in the area, two represent introduced taxa, Brook Trout (*Salvelinus fontinalis*) and Rainbow Trout (*Oncorhynchus mykiss*). The current status of these introductions is unknown.

The remaining 49 species represent valid occurrences, however, several (*i.e.*, 4–5) of these appear to be vagrants occurring only sporadically in the area (see individual species summaries). Major factors driving fish distributions, such as climate change, may

increase the frequency of occurrence of such species and/or promote establishment of spawning populations.

Having outlined all of the above, the occurrence of one species, Largescale Sucker (*Catostomus macrocheilus*), in the southern NT was called into question as this report was being prepared for final printing. The situation is fully described in the write-up for this species. Assuming this most recent analysis is correct then the numbers in the above paragraph should be reduced by n=1.

A number of species occur in adjacent waters of southern jurisdictions in drainage basins upstream of those in the southern NT (Table 2). Accordingly, these may eventually occur in NT waters assuming access routes and conditions are favourable. Alternatively, some of these may already occur in the area but due to poor sampling or natural rarity may not have been recorded as yet. One such species, Iowa Darter (*Etheostoma exile*), has not been recorded in NT waters but occurs in immediately adjacent AB waters. Thus, in summary there are 43 (including Largescale Sucker) valid fish species native to, and established in, NT fresh waters at this time with at least one more likely present (*i.e.*, Iowa Darter).

Voucher Specimens

Despite the data represented here, the fresh waters of the NT are not especially well sampled, particularly for locations away from larger water bodies (*e.g.*, Mackenzie mainstem, large lakes). Exceptions include locations subject to perturbations (*e.g.*, possible pipeline crossings), and areas for which fishing is focal. This artefact, the possibility for change in species' presence and distribution (*e.g.*, due to real shifts in climate), and taxonomic problems for some groups making identifications in the field or by non-experts suspect, all suggest the advisability of collecting voucher specimens and depositing such with recognized national collections. Workers in the area are encouraged to have the identity of fish sampled verified through identification of voucher specimens by qualified experts. Similarly, unique, anomalous, or widely disjunct specimens should be examined by qualified experts to ascertain their significance. Further information can be obtained by contacting J. Reist or the museums listed above.

Species Writeups and Maps

Written descriptions and maps for the validly occurring and accepted species begin on page 10.

---------- **Notes** ----------

---------- Notes ----------

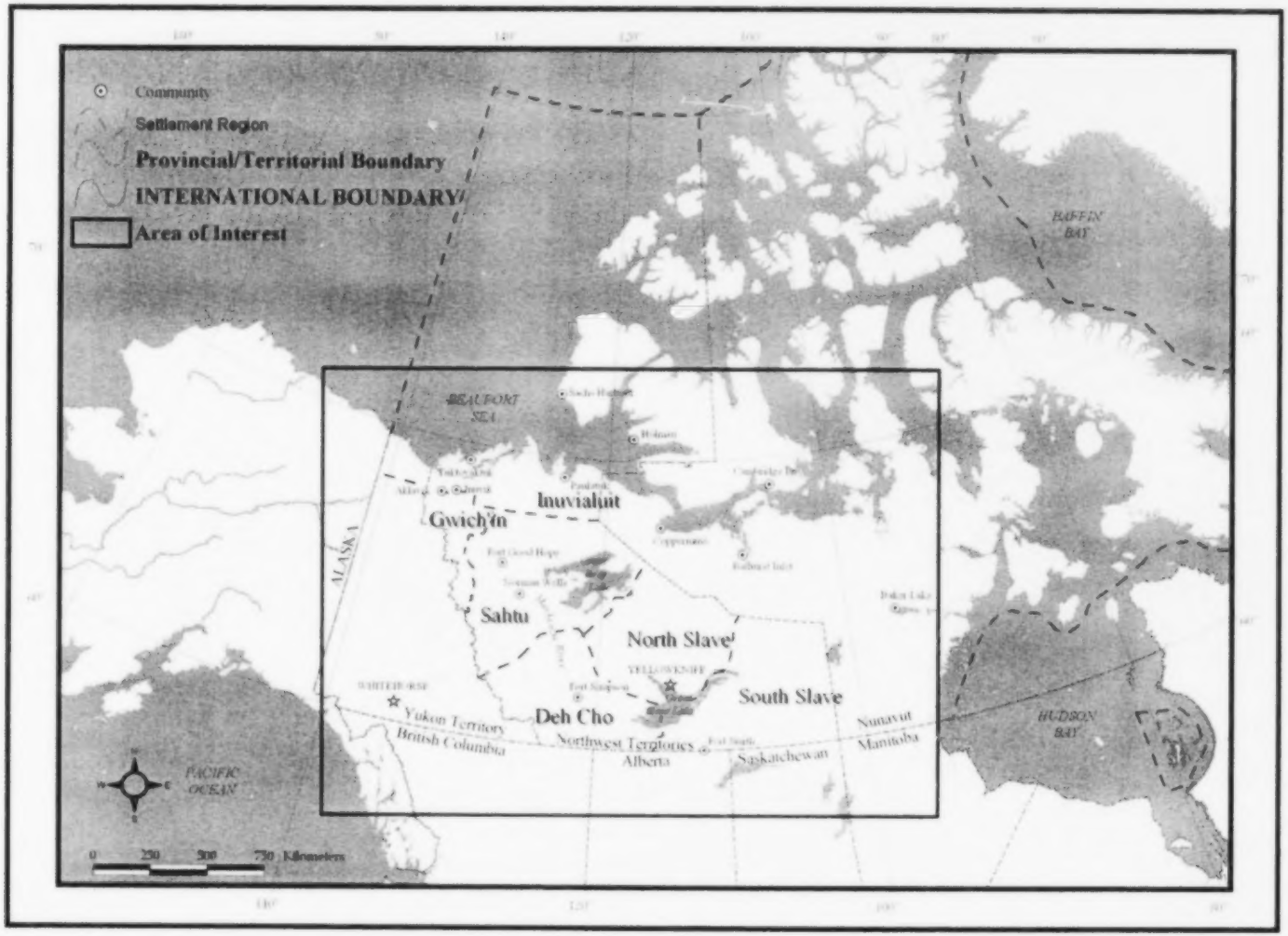


Figure 1. Overview map of the Northwest Territories and region with the area of interest outlined in black.

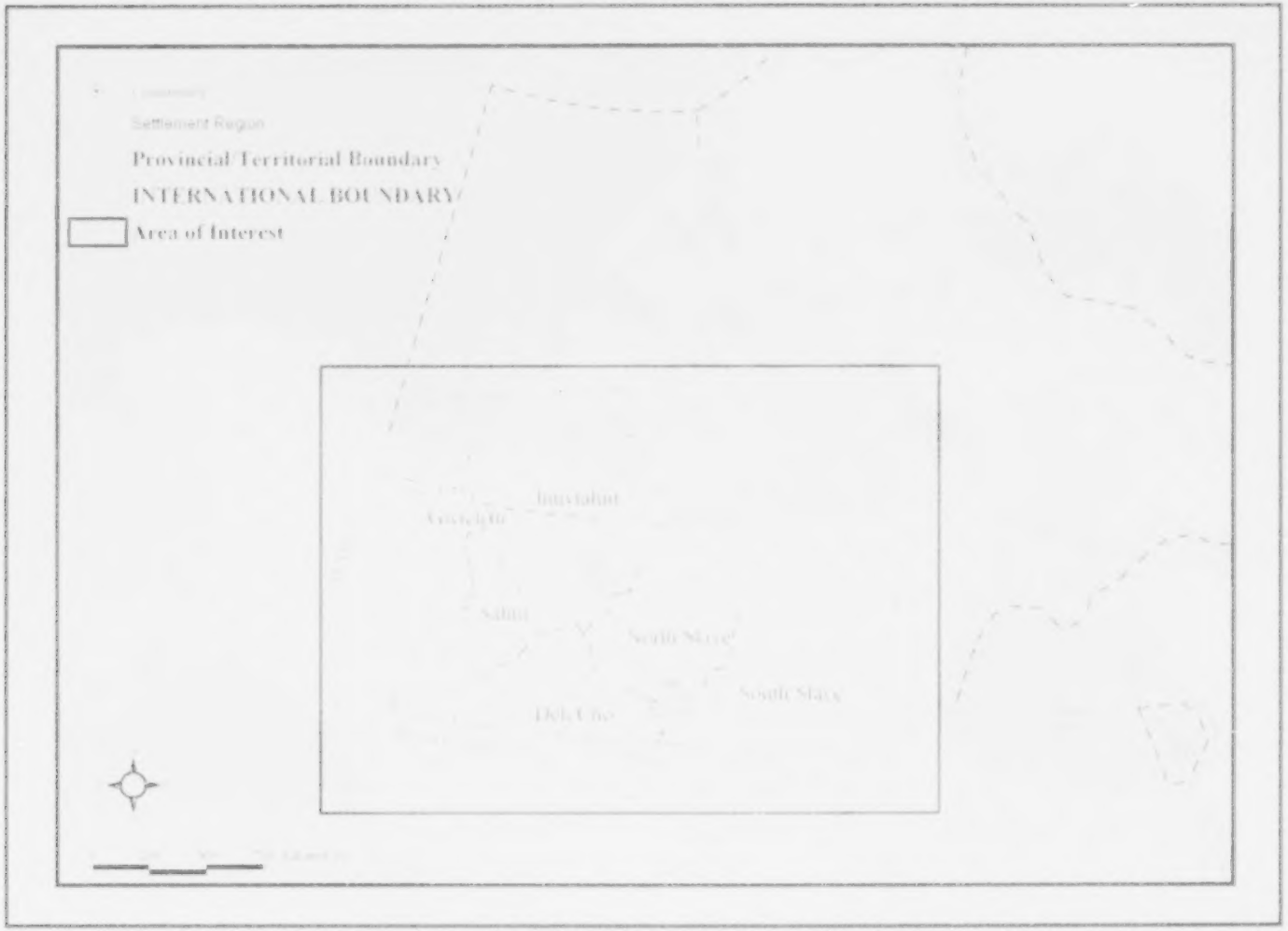


Figure 1. Overview map of the Northwest Territories and region with the area of interest outlined in black.

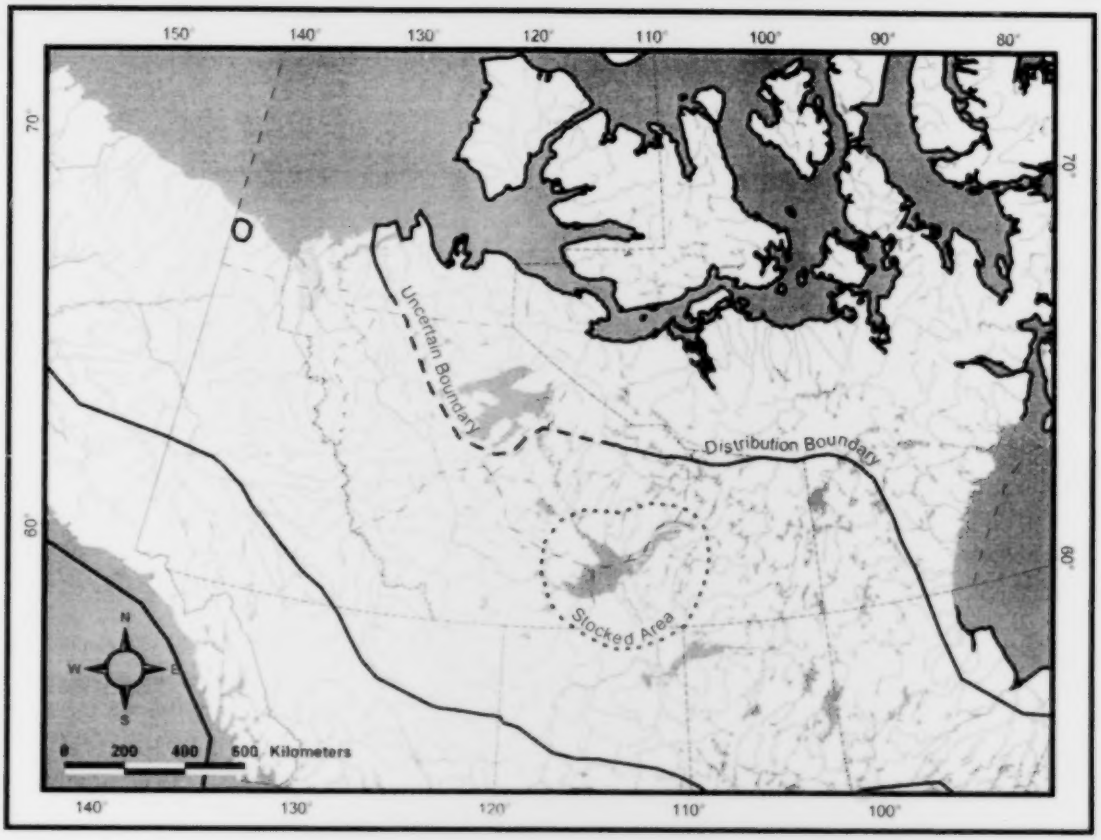


Figure 2. Description of line styles used to depict boundaries on the species distribution maps.

Family 1. Petromyzontidae
[Lampreys (E), Lamproies (F)] – 2 species.

Lampetra camtschatica (Tilesius 1811) [Figs. 3, 4]

Common Names: Arctic Lamprey (E), lamproie arctique (F) (Coad 2006).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006); National: Secure (Canadian Endangered Species Conservation Council 2006).

Habitat: Widely distributed in the NT, the Arctic Lamprey exhibits anadromous, fluvial, and adfluvial life history types. Adults may be parasitic (typically anadromous) or non-parasitic (freshwater only). Spawning occurs in streams and rivers between May and July in shallow water (0.08—0.2 m) over sand and gravel substrates. Eggs are deposited in gravel nests constructed in riffle areas and incubate for 1—2 weeks. Adults die after spawning. After hatching, ammocoetes drift downstream to eddies and backwaters. They burrow into a silty mud substrate where they remain for several years. Once they reach a length of 15—21 cm they transform into immature adults and either migrate to a lake, the ocean, or remain in the river (Richardson et al. 2001; Evans et al. 2002). Immature adults are typically found in limnetic areas of lakes in late summer and fall. Over the summer immature lampreys may increase their size by 18—30 cm (Richardson et al. 2001). The following winter, non-parasitic adults stop feeding, their intestines degenerate, and their gonads mature. The intestines do not degenerate in parasitic adults. Adults of both types migrate upstream the following spring to spawn. Parasitic adults feed on the blood of Ciscoes, Burbot, Longnose Suckers, Lake Trout, Whitefish (Richardson et al. 2001; Evans et al. 2002), and similar species, producing characteristic scars (Reist et al. 1987).

Taxonomic Comments: Formerly recognized as *Lampetra japonica* (Martens 1868) until 1997 when Kottelat showed this was a junior synonym of *L. camtschatica* (Tilesius 1811) (Nelson et al. 2004). McPhail and Lindsey (1970) note that Arctic and American Brook Lamprey are very similar but should be kept as separate species until a review of all relevant species is completed. The parasitic form may be ancestral to the non-parasitic forms recognized by some as distinct species (Mecklenburg et al. 2002) (*i.e.*, *Lethenteron alaskensis* (Darktail Lamprey, Alaskan Brook Lamprey) and *Lampetra appendix* (American Brook Lamprey), the former of which herein likely refers to Arctic Lamprey). Although we do not recognize *L. alaskensis* as a valid taxon, we have listed it separately from *L. camtschatica* as this issue remains unresolved in the literature.

Distribution Comments: This species is widely distributed in the coastal regions of Alaska and upstream areas of the Yukon River system, including the YT (Mecklenburg et al. 2002). It has not been recorded from NU. The NT distribution area for Arctic Lamprey was extended east to include the Horton River in Cape Bathurst (MacDonell 1989). The distribution of Scott and Crossman was followed in the northern YT and northwestern NT (D.B. Stewart pers. comm. 2007).

Notes

Figure 3. Previously published distributions of Arctic Lamprey *(Lampetra camtschatica)* modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

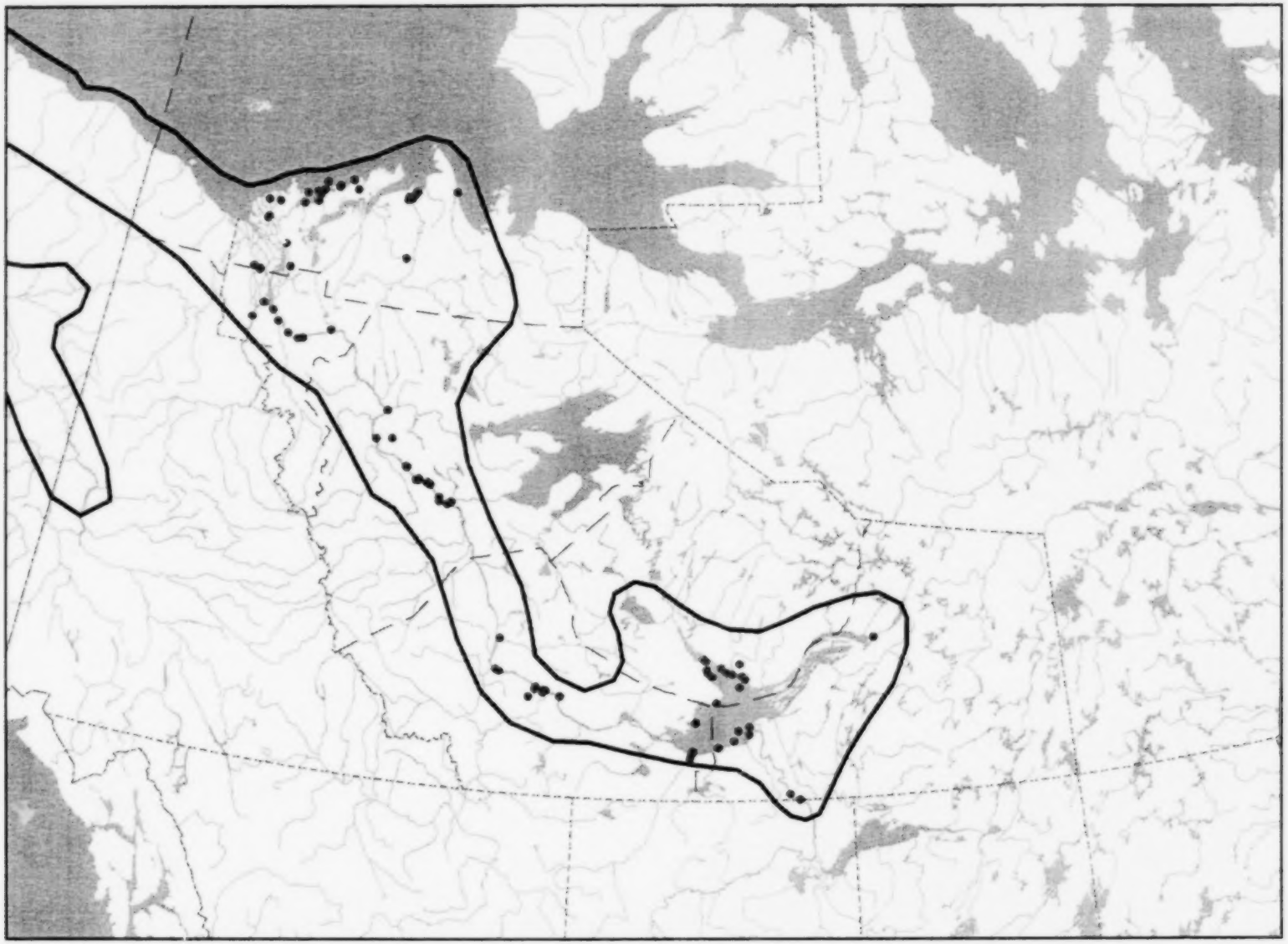


Figure 4. Revised distribution boundaries for Arctic Lamprey (*Lampetra camtschatica*) based on point distributions and previously published boundaries.

Lampetra alaskensis Vladykov and Kott 1978 (Vladykov and Kott 1982) [Figs. 5, 6]

Common Names: Darktail Lamprey (E), lamproie à queue foncée (F) (Houston 1991).

Conservation Status: Regional: Undetermined (Government of the Northwest Territories, Department of Resources, Wildlife and Economic Development 2000), Data deficient (Assessed: 2006) (COSEWIC 2006).

Habitat: In the NT, the Darktail Lamprey has only been recorded from the Martin River (Houston 1987). Habitat information is lacking for this non-parasitic species. It has been found exclusively in fresh water and may exhibit fluvial and adfluvial life history types. Spawning occurs in rivers and streams from May to July and eggs hatch within a few weeks. Adults die shortly after spawning. Ammocoetes undergo a metamorphosis into immature adults at approximately 4 years of age and between 15—21 cm in length. Immature adults migrate downstream to overwinter in lakes. They typically occupy limnetic areas of lakes, but have also been found in streams (Richardson et al. 2001).

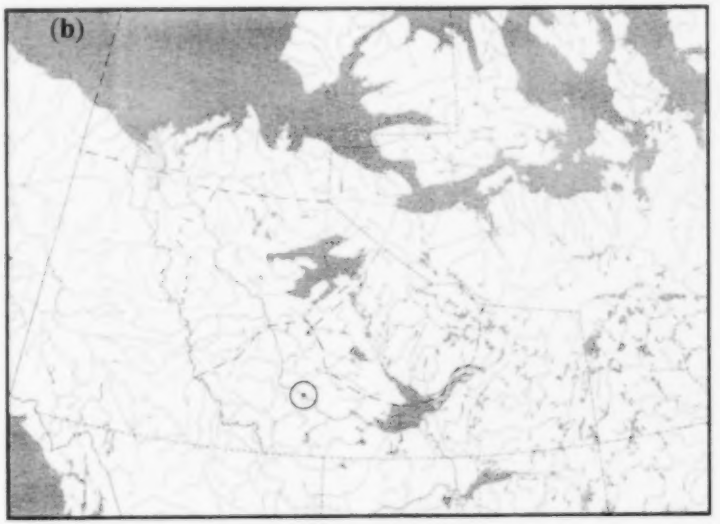
Taxonomic Comments: The Darktail Lamprey is not recognized by the American Fisheries Society and will continue not to be until further studies warrant it (Nelson et al. 2004). This species was noted by Mecklenburg et al. (2002) as being indistinguishable from *L. appendix* (American Brook Lamprey), or a derivative of *L. camtschatica* (Arctic Lamprey). *Lampetra alaskensis* is not considered as a valid taxon herein, and these records most likely should be referred to as Arctic Lamprey. However, we have listed Darktail and Arctic Lamprey separately as a definitive study to resolve this issue has not yet been completed. This species is sometimes referred to as *L. alaskense* (Mecklenburg et al. 2002).

Distribution Comments: The Darktail Lamprey has been recorded as *L. alaskense* in Alaska by Mecklenburg et al. (2002). It has not been recorded from the YT or NU.

---------- Notes ----------

(a)

NOT APPLICABLE



(c)

NOT APPLICABLE

Figure 5. Previously published distribution of Darktail Lamprey (*Lampetra alaskensis*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

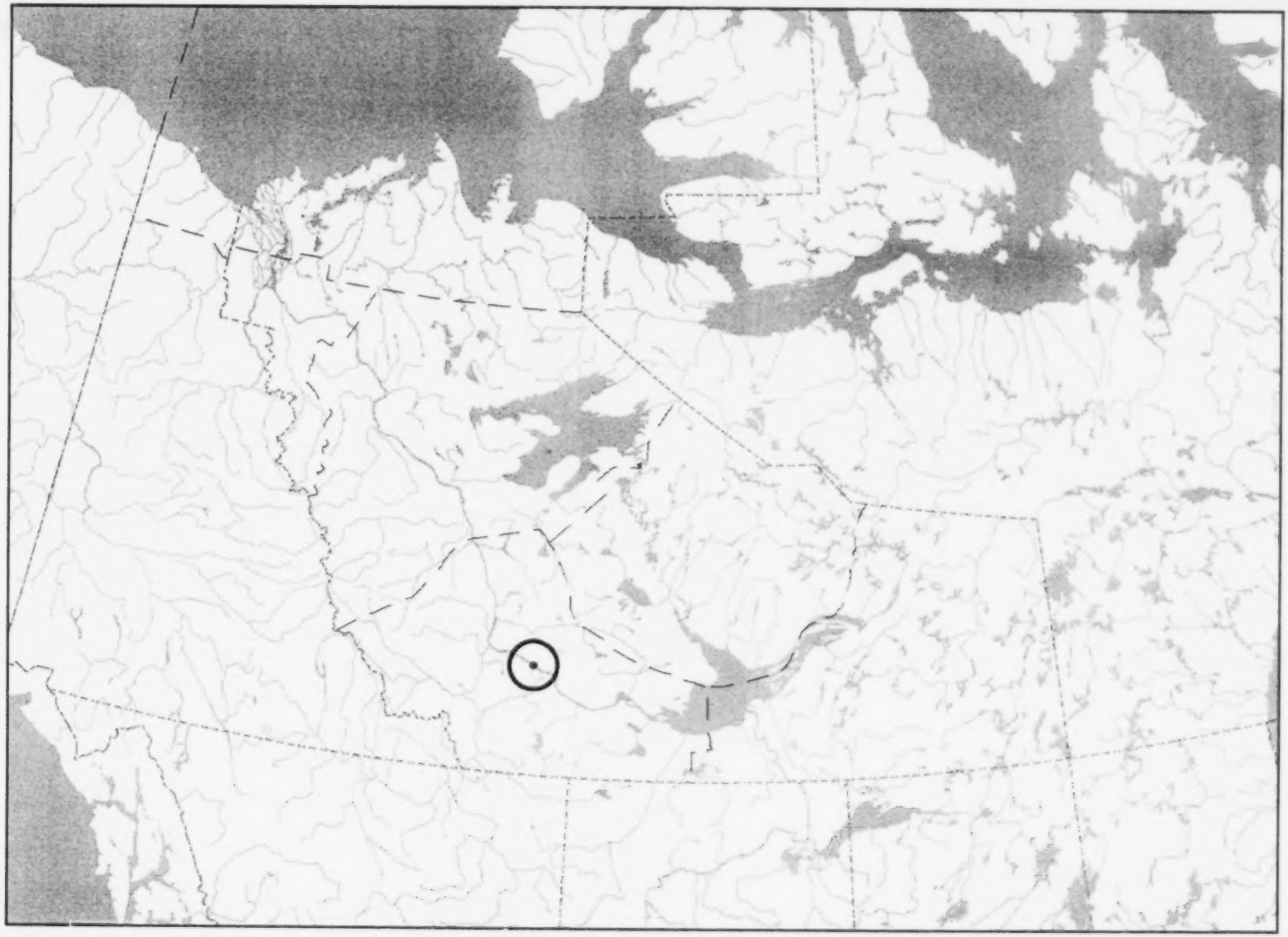


Figure 6. Revised distribution boundaries for Darktail Lamprey (*Lampetra alaskensis*) based on point distributions and previously published boundaries.

Family 2. Hiodontidae
[Mooneyes (E), Laquaiches (F)] – 1 species.

Hiodon alosoides (Rafinesque 1819) [Figs. 7, 8]

Common Names: Goldeye (E), laquaiche aux yeux d'or (F).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: In the NT, Goldeye occur in the Liard and Slave rivers, Great Bear Lake, and from the mouth of the Mackenzie River north to the mouth of the Arctic Red River. This nocturnal species exhibits both riverine and adfluvial life history types. Goldeye tolerate turbid water and inhabit large rivers, small lakes, ponds, marshes, and muddy shallows of large lakes (Richardson et al. 2001; Evans et al. 2002). Spawning takes place between May and early July (Richardson et al. 2001; Evans et al. 2002) at water temperatures ranging from 7–14.5°C (Evans et al. 2002). Goldeye typically spawn in pools of rivers or backwater lakes and ponds associated with rivers over sand and gravel substrates (Richardson et al. 2001; Evans et al. 2002). After hatching, the young float vertically at the water surface and are found in highest concentrations along windward shorelines (Richardson et al. 2001). In rivers, young-of-the-year (YOY) may be found in large eddies or in shallow areas with minimal water movement. Clay substrate is preferred, but areas with sand substrates may also be used (Evans et al. 2002). Adults are found in sheltered bays and shore areas of lakes over a substrate of soft mud (Richardson et al. 2001) and overwintering occurs in deeper sections of lakes and rivers (Richardson et al. 2001; Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: The Goldeye does not occur in Alaska or NU. It occurs in northeastern waters of BC that drain northwards (Scott and Crossman 1973; Lee et al. 1980), thus it may occur in the extreme southeastern YT. The NT distribution area for Goldeye was extended east to include Great Bear Lake (Lee et al. 1980).

Notes

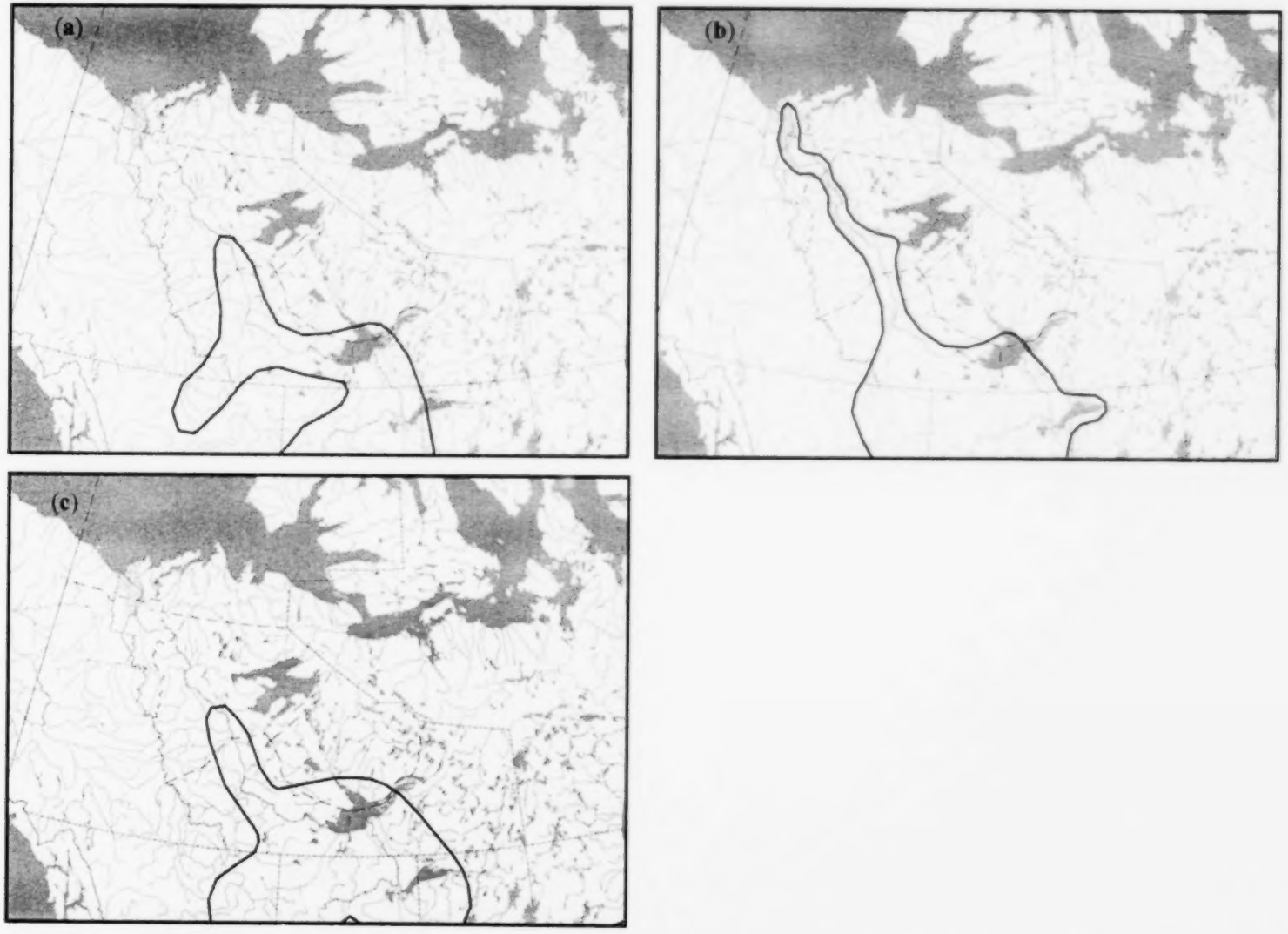


Figure 7. Previously published distributions of Goldeye (*Hiodon alosoides*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

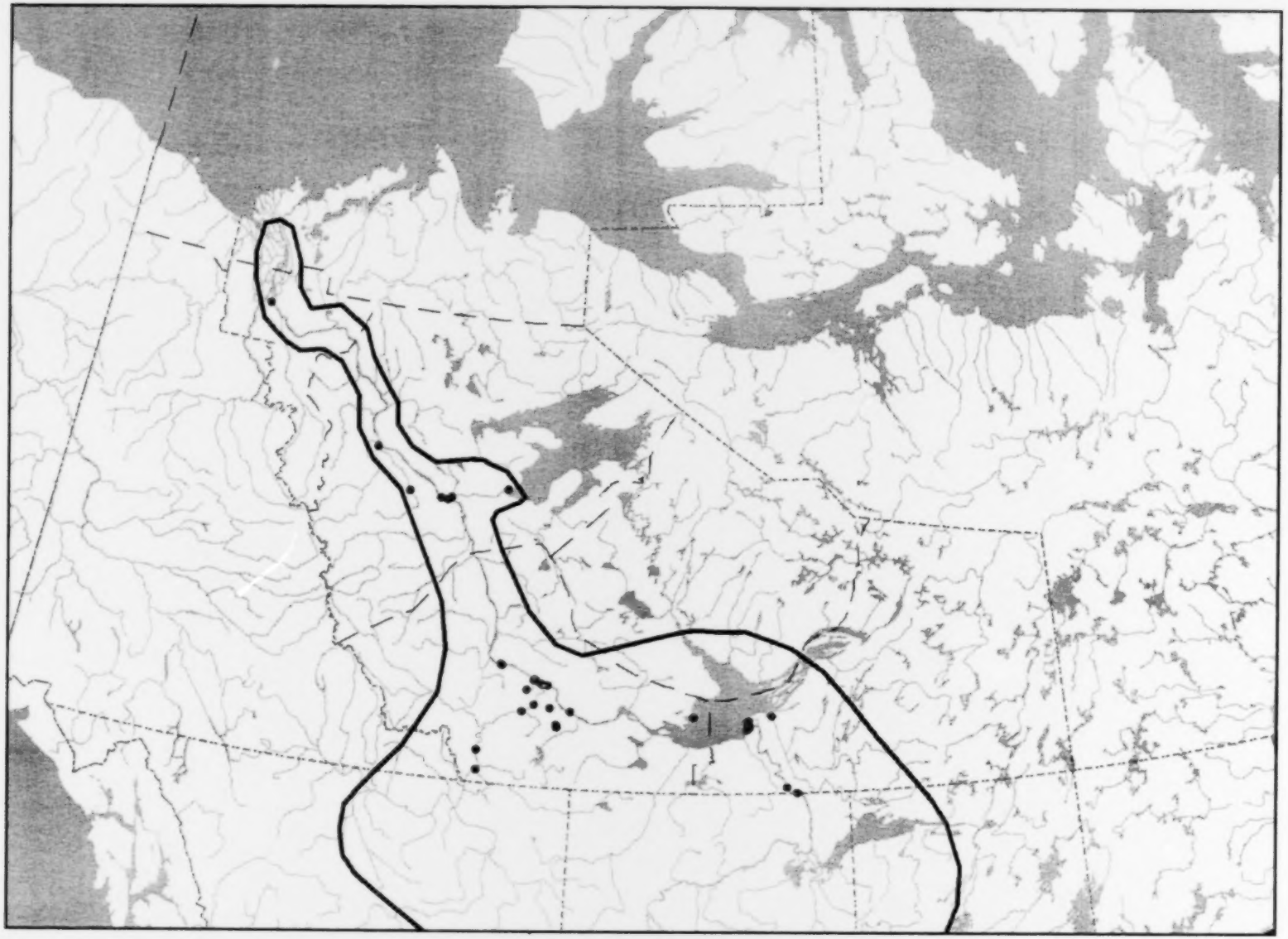


Figure 8. Revised distribution boundaries for Goldeye (*Hiodon alosoides*) based on point distributions and previously published boundaries.

Family 3. Cyprinidae
[Carps and Minnows (E), Carpes et Méné (F)] – 10 species.

Couesius plumbeus (Agassiz 1850) [Figs. 9, 10]

Common Names: Lake Chub (E), méné de lac (F).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: Widely distributed in the NT, the Lake Chub exhibits lacustrine, riverine, and adfluvial life history types, however, lakes are preferred. It is considered a shallow water species typically found in bottom areas near shore, but may move to deeper water in summer. Spawning occurs along lake shores and in streams between April and early August over substrates of rubble, cobble, and gravel at depths between 0.5—2 m. Eggs incubate for approximately two weeks (Richardson et al. 2001; Evans et al. 2002). After spawning, adfluvial adults return to the lake where they remain until the next spawning season (Evans et al. 2002). Adults are generally found at depths of 3.5—5 m over a sand, rubble, cobble, and boulder substrate (Richardson et al. 2001; Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: The Lake Chub is distributed in central Alaska (Mecklenburg et al. 2002), the YT, and in the westernmost areas of the Kivalliq (formerly Keewatin region) area in NU (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area for this species was extended to include Great Bear Lake, as it occurs both upstream in the Camsell River system (Wong and Whillans 1973) and downstream in the Great Bear River (Chang-Kue and Cameron 1980). One point in Great Bear Lake (Stewart 1997) was deemed to be invalid (D.B. Stewart pers. comm. 2007).

---------- Notes ----------

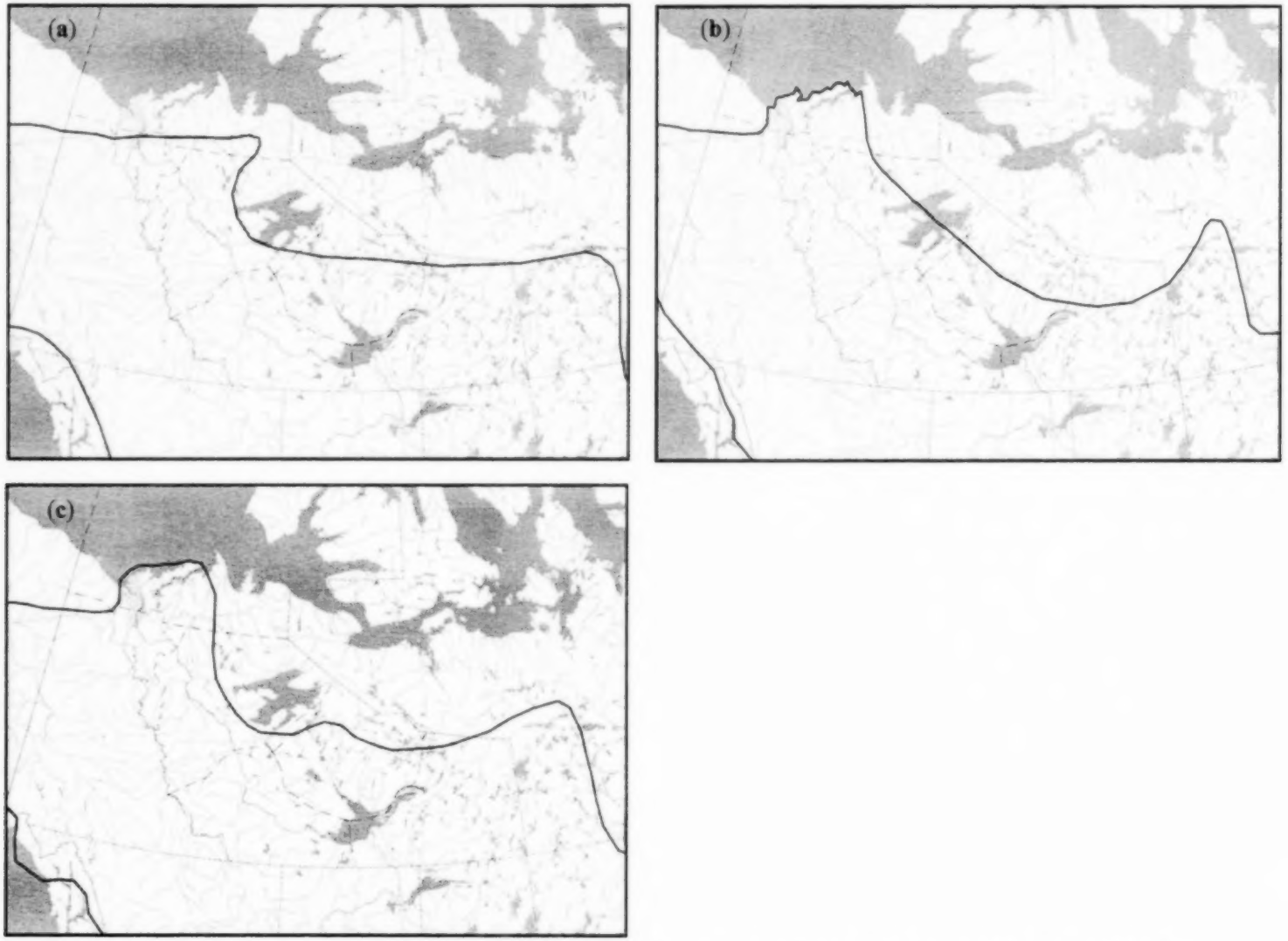


Figure 9. Previously published distributions of Lake Chub (*Couesius plumbeus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

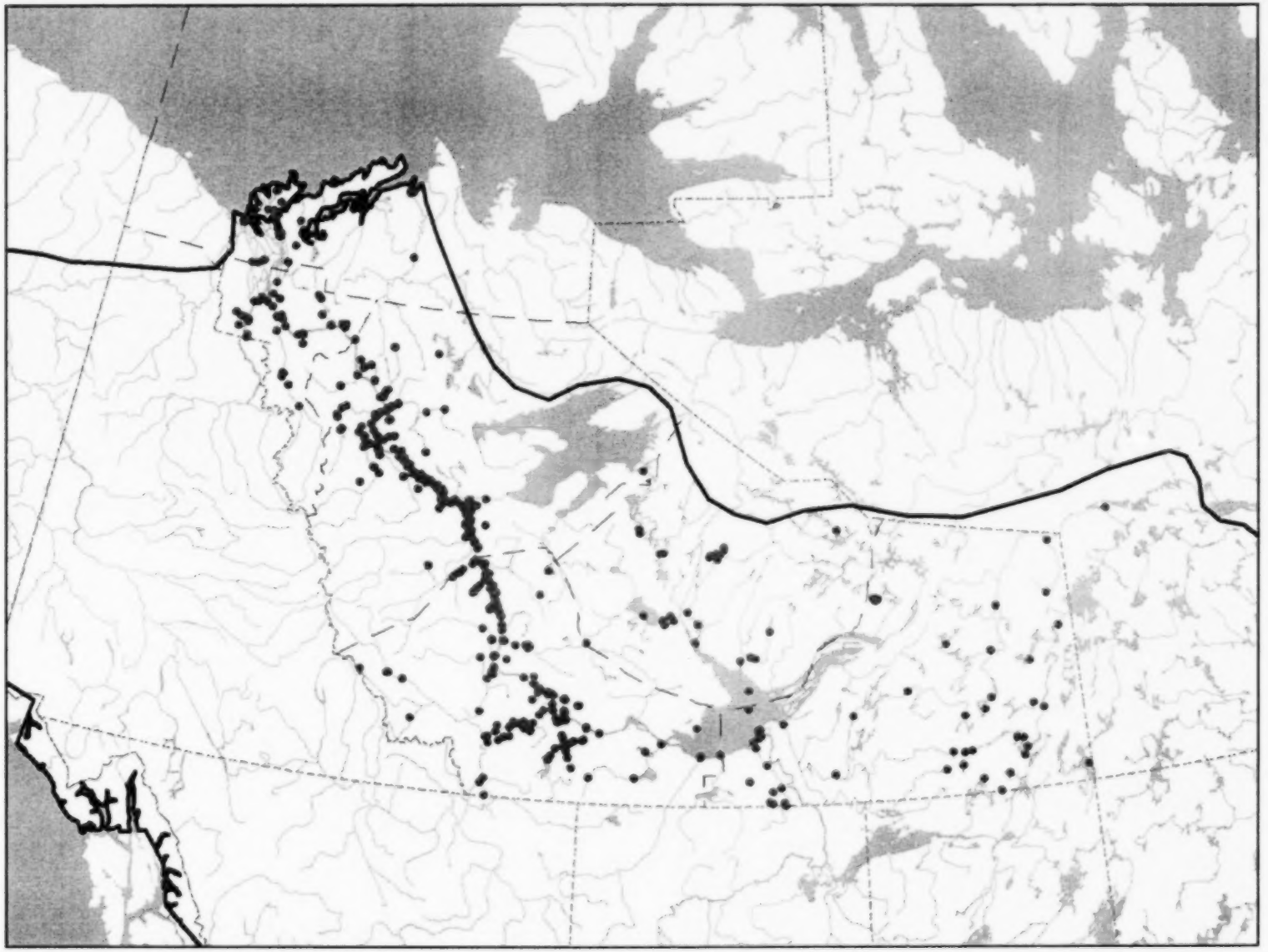


Figure 10. Revised distribution boundaries for Lake Chub (*Couesius plumbeus*) based on point distributions and previously published boundaries.

Margariscus margarita (Cope 1867) [Figs. 11, 12]

Common Names: Pearl Dace (E), mulet perlé (F).

Conservation Status: Regional: Sensitive (Working Group on General Status of NWT Species 2006).

Habitat: Pearl Dace are restricted to the southern area of the NT. This species may exhibit lacustrine and riverine life history types and is found in cool bogs, creeks, lakes, ponds, and slow streams. Spawning occurs from May to June in streams and lakes. Stream spawning takes place in shallow water (0.46–0.61 m) over a sand and gravel substrate in a light to moderate current. Young are generally found over substrates of silt, clay, and detritus at depths of 0–5 m in vegetated areas. Lake spawning occurs over organic substrates and may take place in vegetated areas on the lake edge. In lakes >5 m deep, adults move to the cooler hypolimnion in summer (Richardson et al. 2001; Evans et al. 2002).

Taxonomic Comments: Known in older literature as *Semotilus margarita*.

Distribution Comments: The Pearl Dace is not found in Alaska or NU. It occurs in northern BC waters adjacent to the southeastern YT (Scott and Crossman 1973; Lee et al. 1980; McPhail and Carveth 1994), thus its presence there is possible. The NT distribution area for this species was extended east along the Mackenzie River to the Liard and South Nahanni rivers, and Rabbitkettle Lake (Wickstrom 1977), and north to the vicinity of the Hume River (University of British Columbia Fish Collection 2005), but verification is needed to confirm these extensions.

Notes

Figure 11. Previously published distributions of Pearl Dace (*Margariscus margarita*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

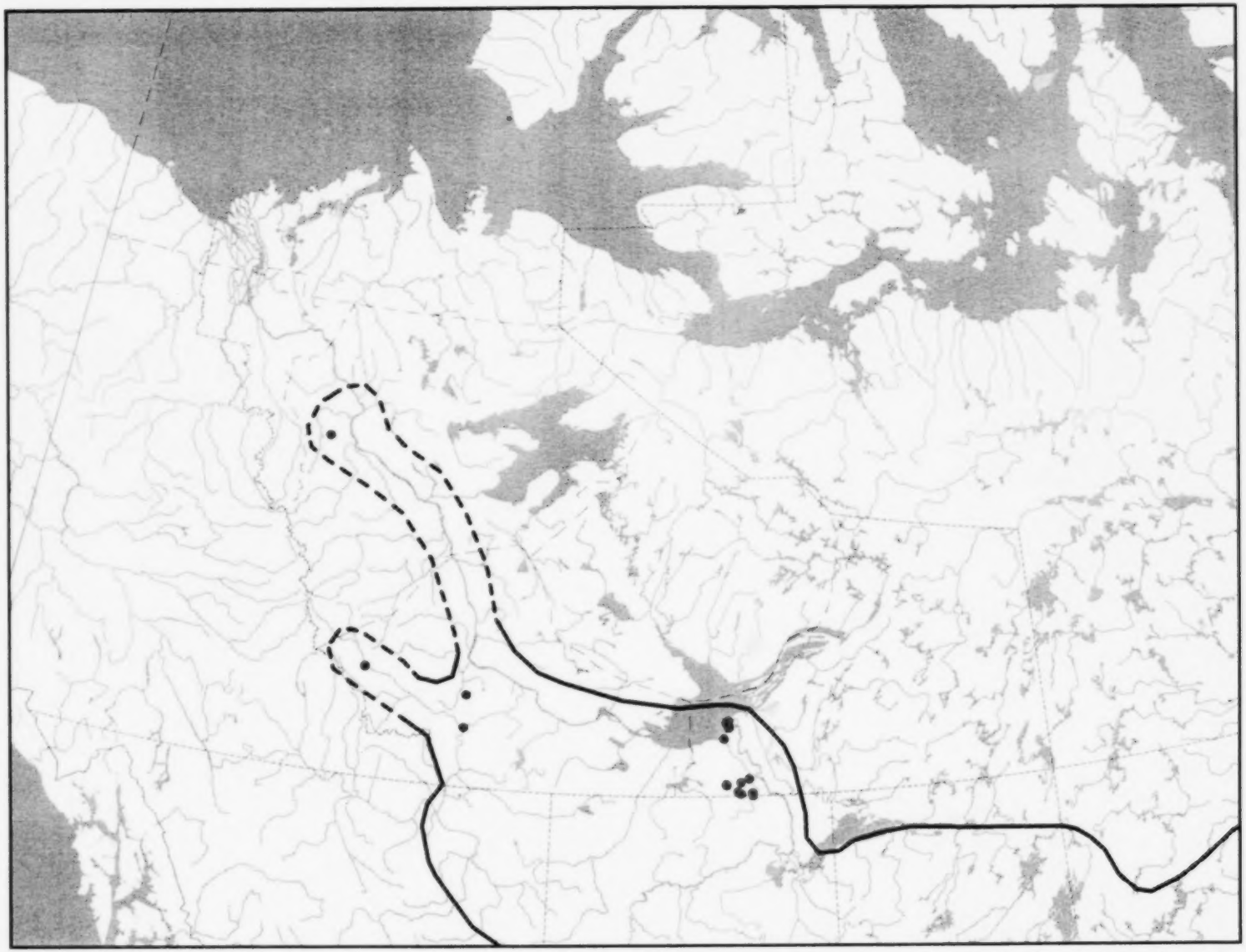


Figure 12. Revised distribution boundaries for Pearl Dace (*Margariscus margarita*) based on point distributions and previously published boundaries.

Mylocheilus caurinus (Richardson 1836) [Figs. 13, 14]

Common Names: Peamouth (E), méné deux-barres (F) (Coad 2006).

Conservation Status: Not assessed (new occurrence).

Habitat: Found in Smith Creek, Poplar River, and in the vicinity of Kennady Lake in southern NT, the Peamouth exhibits lacustrine, adfluvial, and riverine life history types. It is generally found in slow moving areas of rivers and lakes. Adults often occur in schools in association with aquatic vegetation and do not appear to have any substrate preferences. Feeding occurs at depths ≥ 20 m during the day; at night they rise to the surface to feed on insects. Spawning occurs from May to June over stone, gravel, rubble, and sand substrates in shallow areas of lakes or in outlet streams near lakes. After hatching, the young form schools and may remain along the shoreline over rubble and gravel substrates in association with submerged vegetation, moving to deeper water in late summer. The young may also be pelagic (Richardson et al. 2001).

Taxonomic Comments: None.

Distribution Comments: The Peamouth does not occur in Alaska, the YT, or NU. The NT distribution area for this species was extended along the Mackenzie River upstream from Smith Creek, including Great Slave Lake east to Fletcher Lake (McCart et al. 1974; F.F. Slaney & Company Ltd. 1974; EBA Engineering Consultants Ltd. and Jacques Whitford Environment Ltd. 2000). The Fletcher Lake specimen identifications were confirmed by Dr. K.W. Stewart (pers. comm. 2006) of the University of Manitoba. McPhail (2007) indicates that Peamouth have not reached the Liard River basin of northern BC. Thus, their occurrence in southern NT must be considered suspect especially given the absence of voucher specimens. Regardless, the disjunct distribution indicates the need for more field sampling and studies to better understand and confirm the reported occurrences in this area. Extensive recent sampling effort in 2007 in suitable habitat near the Fletcher Lake site that specifically attempted to capture Peamouth and other cyprinids yielded no specimens of Peamouth (based on preliminary identifications) (P. Cott pers. comm. 2007). Thus, confirmation for this area is also required.

Notes

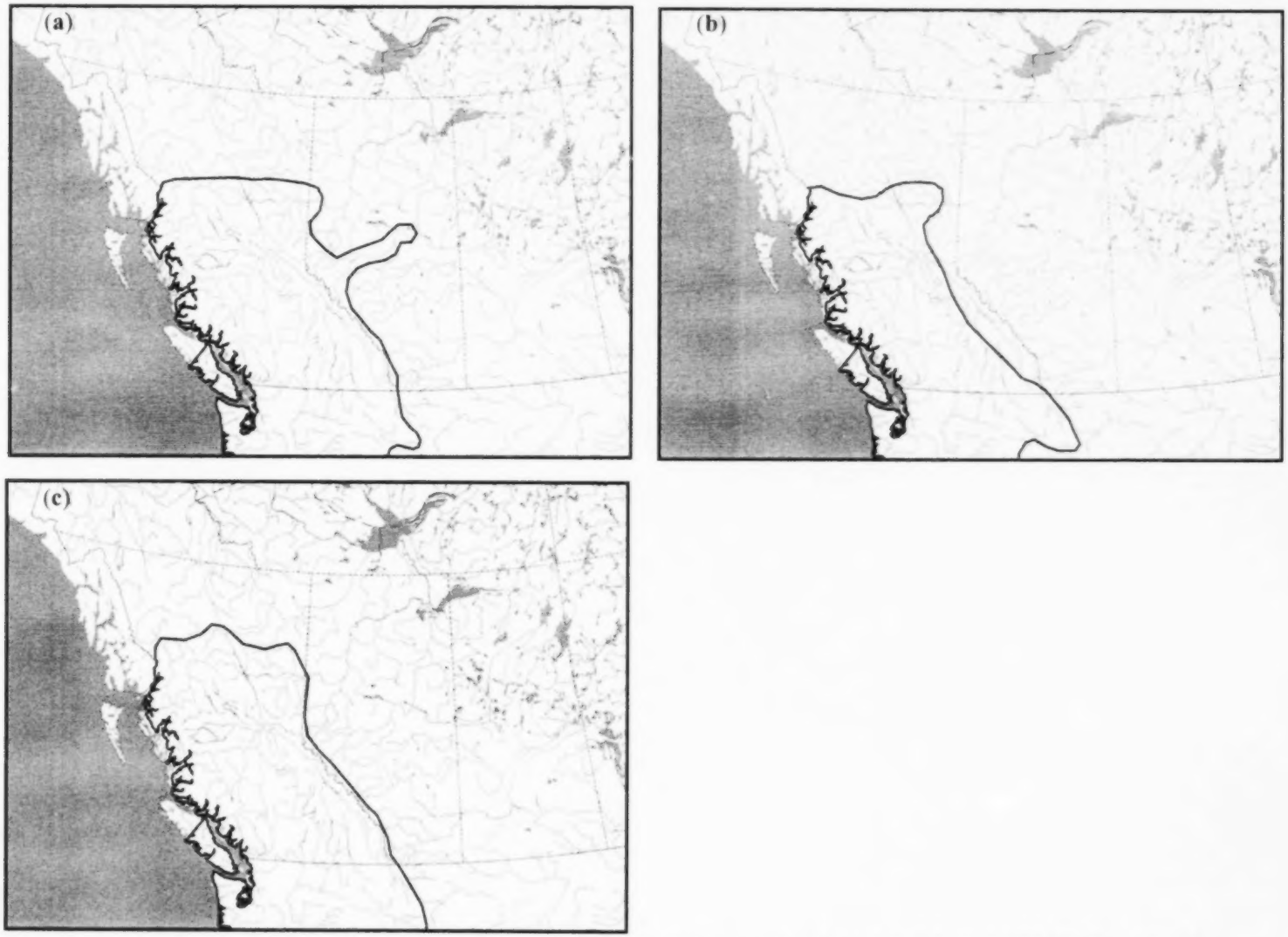


Figure 13. Previously published distributions of Peamouth (*Mylocheilus caurinus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

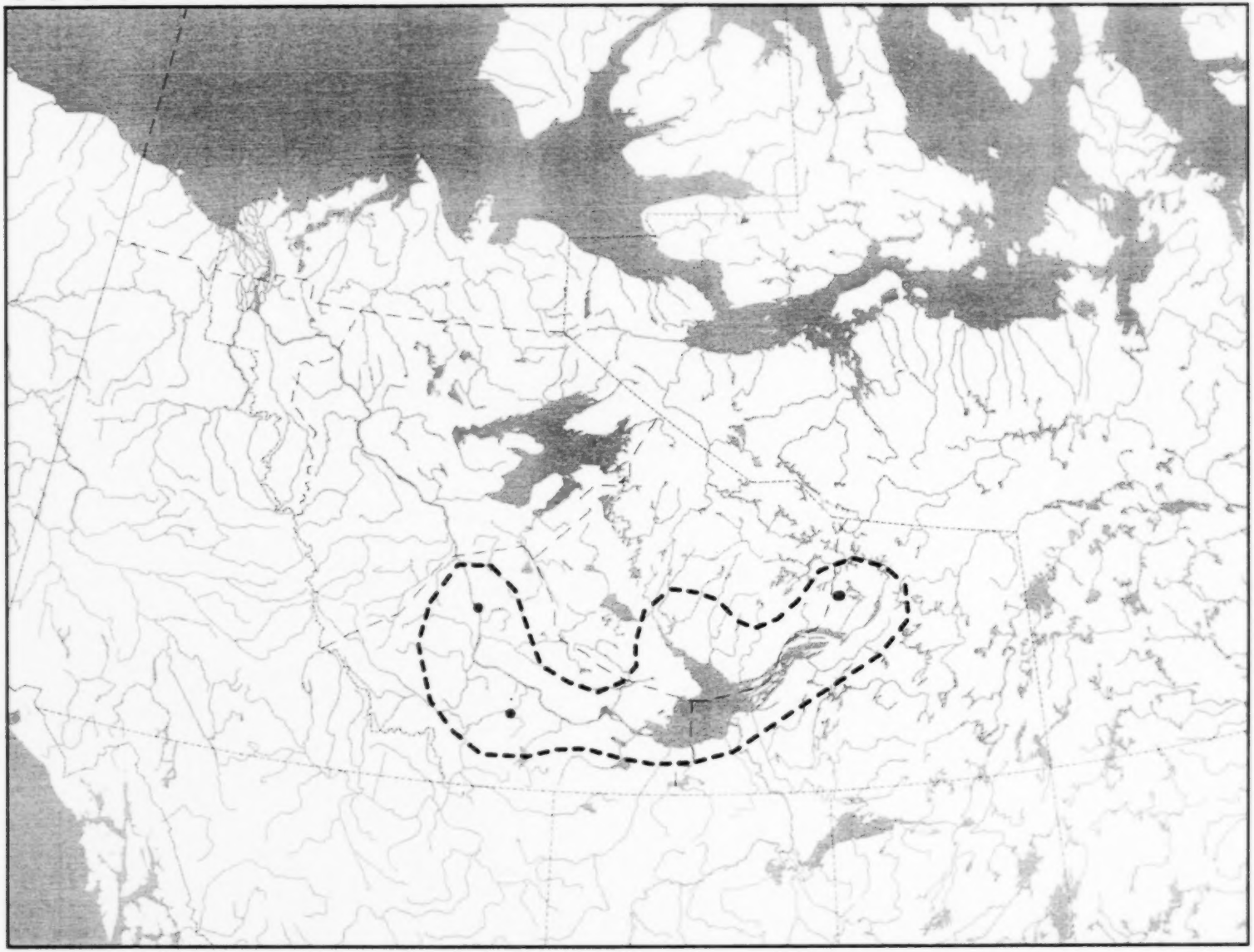


Figure 14. Revised distribution boundaries for Peamouth (*Mylocheilus caurinus*) based on point distributions and previously published boundaries.

Notropis atherinoides Rafinesque 1818 [Figs. 15, 16]

Common Names: Emerald Shiner (E), méné émeraude (F).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: Distributed within the central and southern Mackenzie River system, the Emerald Shiner is a pelagic species found in large lakes and rivers. Principally lacustrine, this species also exhibits riverine and adfluvial life history types. Spawning occurs in late spring or early summer at depths between 2—6 m. Eggs are scattered over sand and gravel substrates and hatch within 24—32 hours of fertilization. Prolarvae become free swimming after four days, at which point they form large schools and occur over sand, rock, clay, and silt substrates. Young are planktonic, remain in large schools, and typically inhabit the upper 2—4 m in nearshore areas of lakes. Adults are pelagic and rise to the surface at night to feed. They make seasonal movements to offshore waters in summer and return to inshore areas in fall. Schools are often found around structures such as docks and piers which may be used as cover (Richardson et al. 2001; Evans et al. 2002). Riverine Emerald Shiners commonly occur at depths between 0.6—1.5 m over sand, gravel, and mud substrates. They may also be found over substrates of silt, rubble, clay, and boulders (Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: The Emerald Shiner does not occur in Alaska, and has not yet been recorded from YT waters but does occur in northeastern BC drainages (Scott and Crossman 1973; Lee et al. 1980); it does not occur in NU. The NT distribution area for Emerald Shiner was extended north along the Mackenzie River to north of the Great Bear River (McCart 1982; Low et al. 1997). The distribution area north of Elliot Creek (AMEC Americas Limited 2005a) is considered uncertain. The distribution given by McPhail and Lindsey (1970) was followed to the north of Great Slave Lake and that of Scott and Crossman (1973) was followed to the south (D.B. Stewart pers. comm. 2007).

Notes

Figure 15. Previously published distributions of Emerald Shiner (*Notropis atherinoides*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

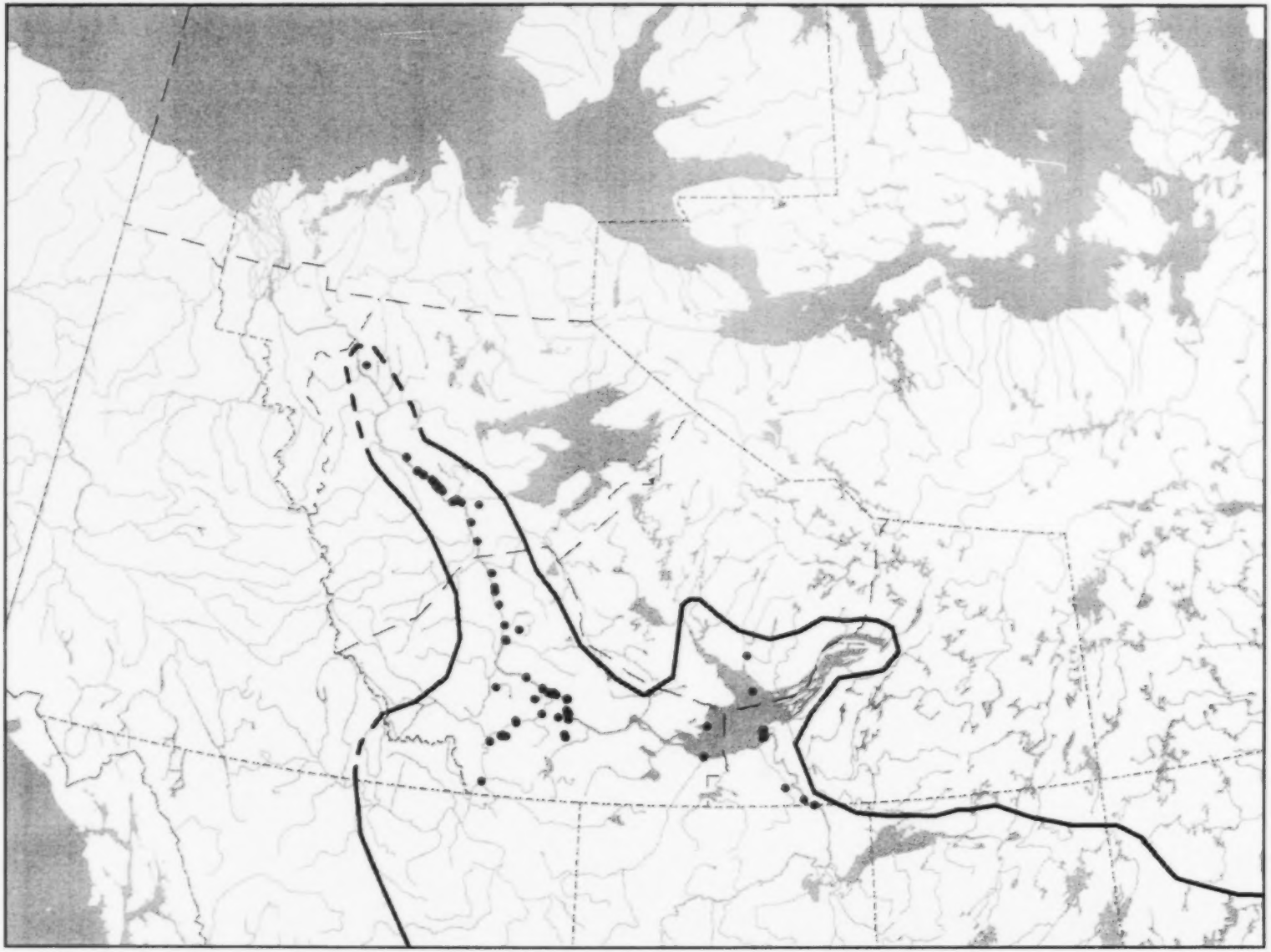


Figure 16. Revised distribution boundaries for Emerald Shiner (*Notropis atherinoides*) based on point distributions and previously published boundaries.

Notropis hudsonius (Clinton 1824) [Figs. 17, 18]

Common Names: Spottail Shiner (E), queue à tache noire (F).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: Distributed throughout the Mackenzie River system, the Spottail Shiner exhibits riverine and lacustrine life history types. This species occurs in larger lakes and rivers. Spawning occurs in spring and early summer (depending on latitude and water temperature) over sandy shoals, gravel, and rubble in shallow water (0—5 m) (Richardson et al. 2001; Evans et al. 2002). Riverine young and adults inhabit quiet river sloughs and water with moderate currents at depths between 0.1—1.5 m over sand, gravel, mud, silt, and occasionally rubble, hardpan, bedrock, boulder, clay, and detritus substrates (Evans et al. 2002). In spring and summer they inhabit warmer water with sand and gravel substrates at depths <13 m and may be found in association with submerged and emergent vegetation (Richardson et al. 2001; Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: The Spottail Shiner is not present in Alaska, possibly occurs in the extreme southeastern YT, and is not present in NU (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area for Spottail Shiner was extended north to encompass the Mackenzie River Delta based on points published in the EIS report for the Mackenzie Gas Pipeline (AMEC Americas Limited 2005b). However, the extended area is considered uncertain as the sources of the occurrences are not provided in the report.

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Figure 17. Previously published distributions of Spottail Shiner (*Notropis hudsonius*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

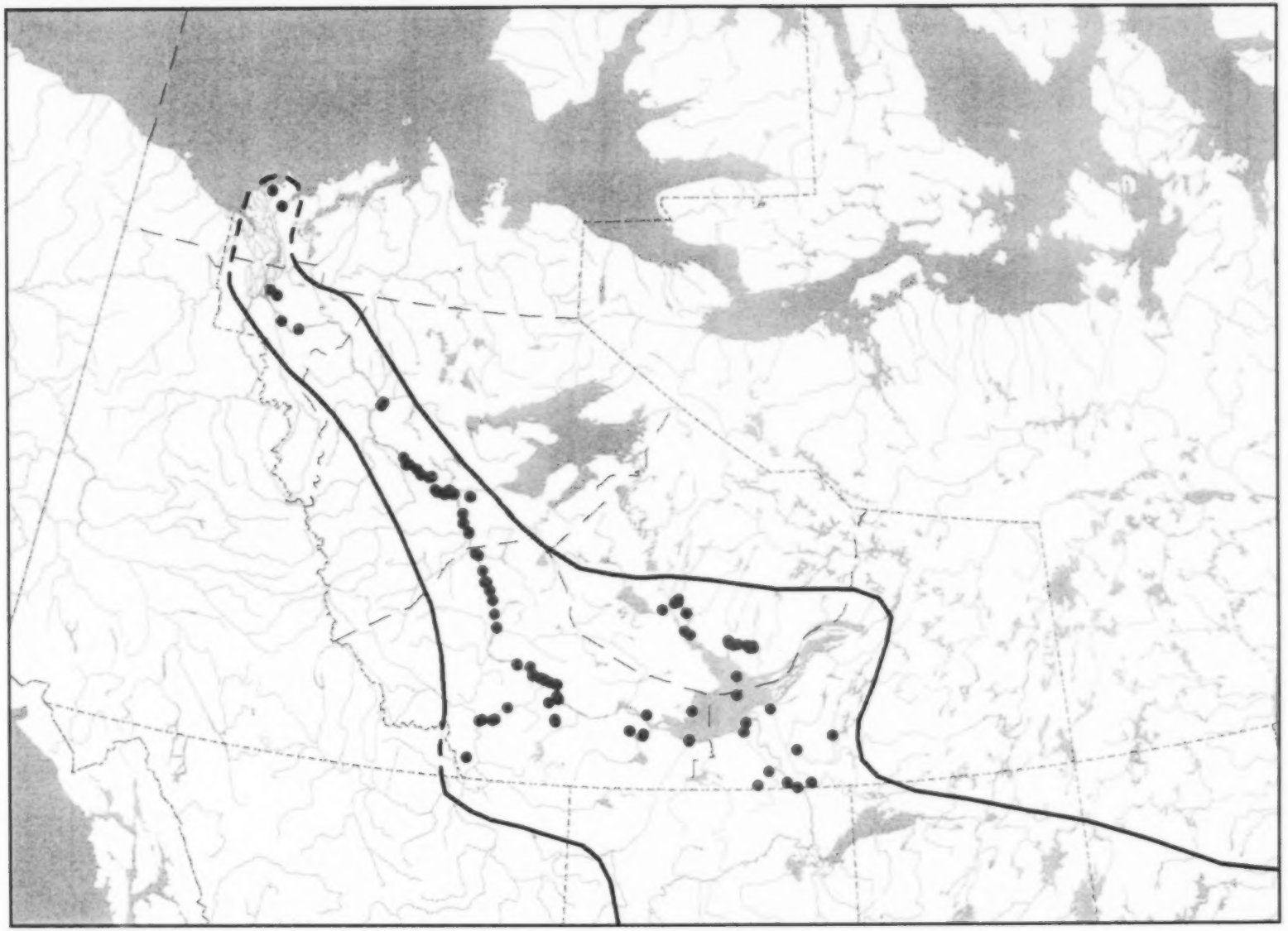

Figure 18. Revised distribution boundaries for Spottail Shiner (*Notropis hudsonius*) based on point distributions and previously published boundaries.

Phoxinus eos (Cope 1862) [Figs. 19, 20]

Common Names: Northern Redbelly Dace (E), ventre rouge du nord (F).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: Distributed in the Mackenzie River system, the northern limit of this species is the mouth of the Arctic Red River. The Northern Redbelly Dace exhibits lacustrine and riverine life history types and inhabits boggy lakes, beaver ponds, small lakes, and pool-like expansions of streams (Richardson et al. 2001; Evans et al. 2002). Spawning occurs in spring or early summer at which time eggs are scattered in masses of filamentous algae over a gravel substrate. The eggs incubate for 8—10 days at a water temperature of 21.1—26.7°C (Evans et al. 2002). Adults are found over substrates of detritus, sand, gravel, silt, and mud, typically in vegetated areas at depths of 0.1—0.5 m during the day and >2 m at night (Richardson et al. 2001; Evans et al. 2002). Northern Redbelly Dace sometimes hybridize with Finescale Dace (*P. neogaeus*) as they occupy similar habitats and spawn at the same time (Richardson et al. 2001).

Taxonomic Comments: Known in older literature as *Chrosomus eos*.

Distribution Comments: The Northern Redbelly Dace is not present in Alaska, possibly occurs in the extreme southeastern YT based upon its occurrence in adjacent southwestern NT, and is absent from NU (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area for Northern Redbelly Dace was extended north along the Mackenzie River to the Arctic Red River (Stein et al. 1973a; McCart et al. 1974; Porter et al. 1974; McKinnon et al. 1982), and south along the Liard River (McKinnon and Hnytka 1985; Golder Associates Ltd. 1999). The distribution was also extended east into Saskatchewan to include Lake Athabasca (Mandrak unpubl. 2004) and into northeastern BC (McPhail, 2007).

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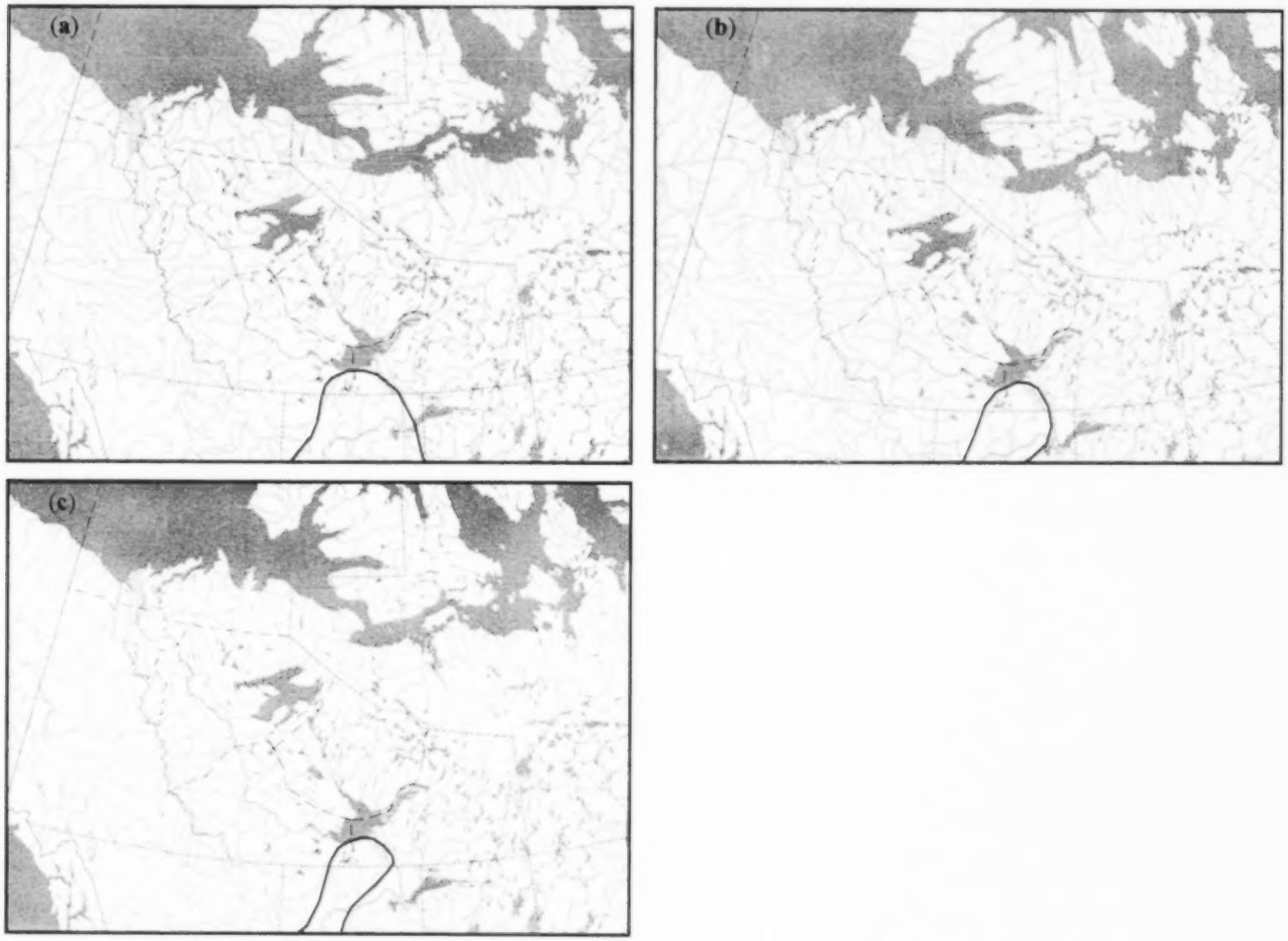

Figure 19. Previously published distributions of Northern Redbelly Dace (*Phoxinus eos*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

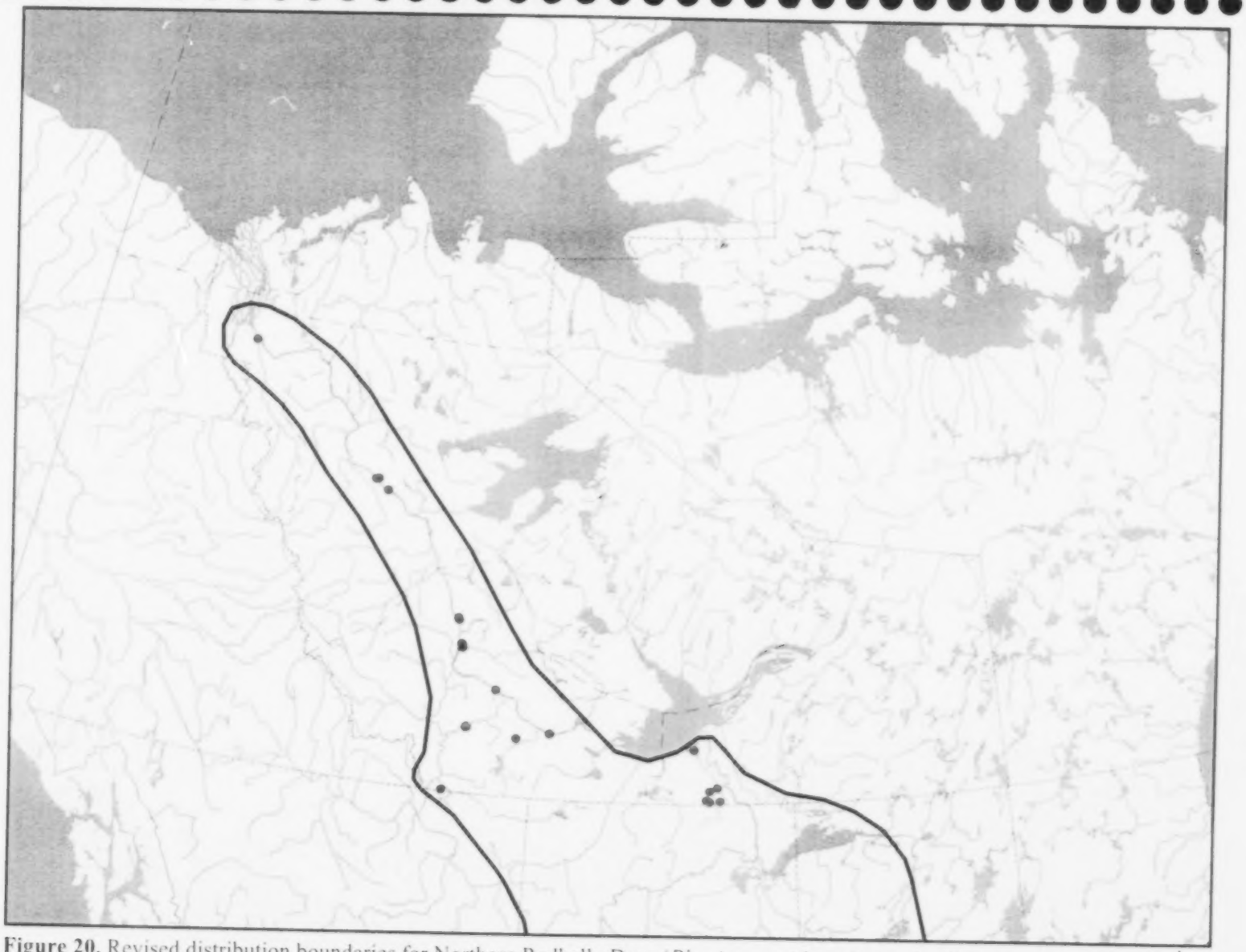

Figure 20. Revised distribution boundaries for Northern Redbelly Dace (*Phoxinus eos*) based on point distributions and previously published boundaries.

Phoxinus neogaeus Cope 1867 [Figs. 21, 22]

Common Names: Finescale Dace (E), ventre citron (F).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: In the NT, the Finescale Dace occurs in the Mackenzie River system. This species exhibits lacustrine and riverine life history types. It is usually found in light to dark brown water and inhabits bog ponds, streams, and large lakes. Spawning occurs from spring to mid-summer and has been reported under the cover of trees, brush, and logs in water 0.5—0.9 m in depth. Eggs hatch after four days of incubation and young are free swimming three days later. Adults often occur at depths between 0.1—0.5 m over sand, gravel, silt, and mud substrates. Finescale and Northern Redbelly Dace (*P. eos*) sometimes hybridize and may share similar spawning habitat requirements (Richardson et al. 2001; Evans et al. 2002).

Taxonomic Comments: Known in older literature as *Chrosomus neogaeus*.

Distribution Comments: The Finescale Dace is not found in Alaska. It may occur in the extreme southeastern YT based upon its distribution in northeastern BC; it is absent from NU (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area for Finescale Dace was extended north to the Mackenzie Delta (Stein et al. 1973a) and the Arctic Red River (Royal Ontario Museum 2006).

Notes

Figure 21. Previously published distributions of Finescale Dace (*Phoxinus neogaeus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

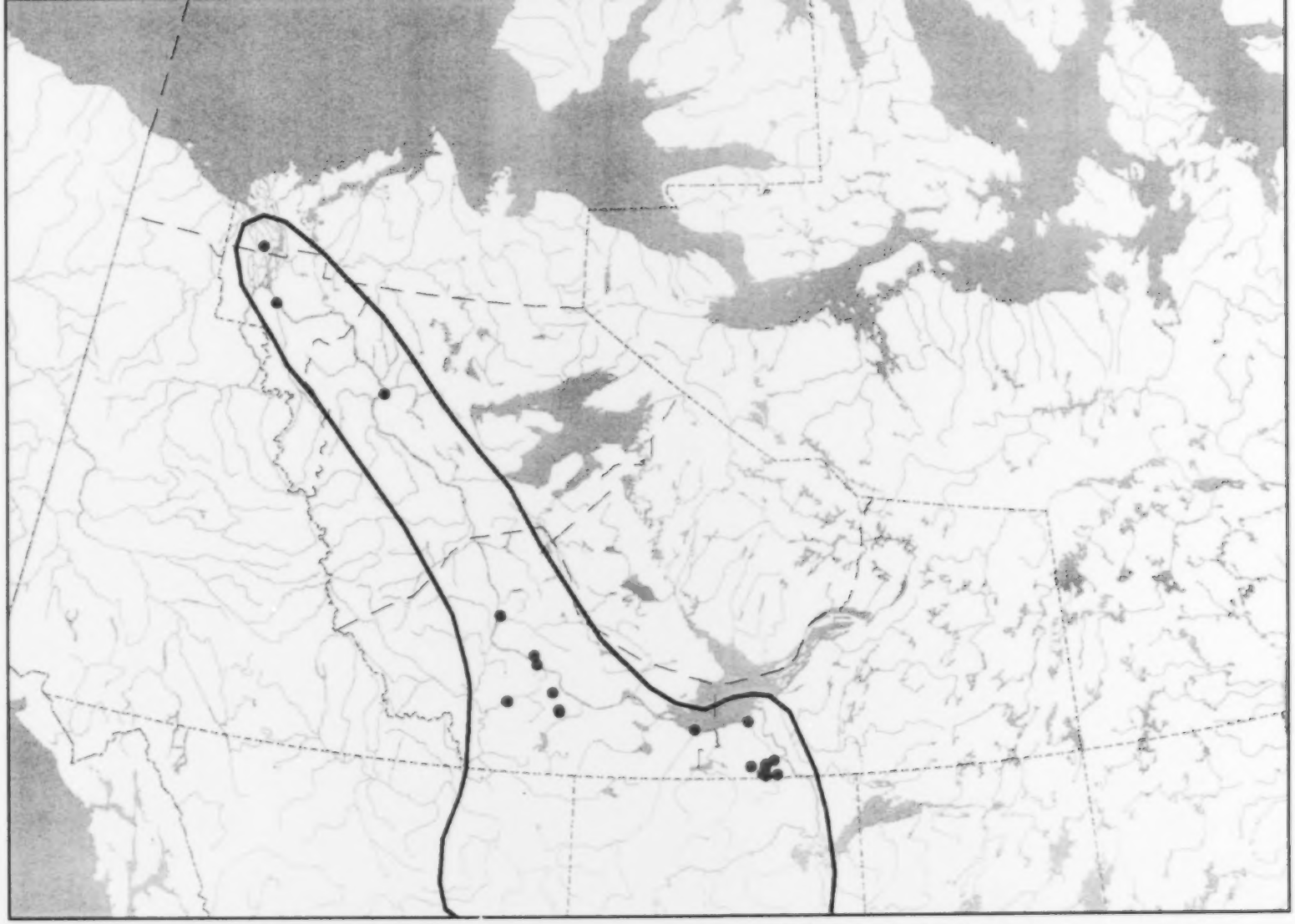

Figure 22. Revised distribution boundaries for Finescale Dace (*Phoxinus neogaeus*) based on point distributions and previously published boundaries.

Pimephales promelas Rafinesque 1820 [Figs. 23, 24]

Common Names: Fathead Minnow (E), tête-de-boule (F).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: Reported from the south-central NT, the Fathead Minnow exhibits lacustrine and riverine life history types. In southern areas, spawning occurs from April to mid-August. The male constructs a nest under rocks, logs, branches, boards, or occasionally lily pads in 0.61—0.91 m of water. The female deposits adhesive eggs on the undersurface of the nest. The male fertilizes the eggs and defends the nest. Incubation generally lasts from 4.5—6 days and is dependent on water temperature. The young are often found in shallow water over sand and mud substrates in protected areas such as marshes, harbours, and creek mouths. Adults are typically more active at night, while juveniles are more active during the day (Richardson et al. 2001; Evans et al. 2002). Fathead Minnows are tolerant of high water temperatures, low dissolved oxygen, and turbidity (Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: The Fathead Minnow is not found in Alaska, the YT, or NU. The NT distribution area for the Fathead Minnow was extended slightly north to the Little Buffalo River (University of Alberta Museum of Zoology 2005). The distribution was also extended east into northern Manitoba (Mandrak unpubl. 2004).

Notes

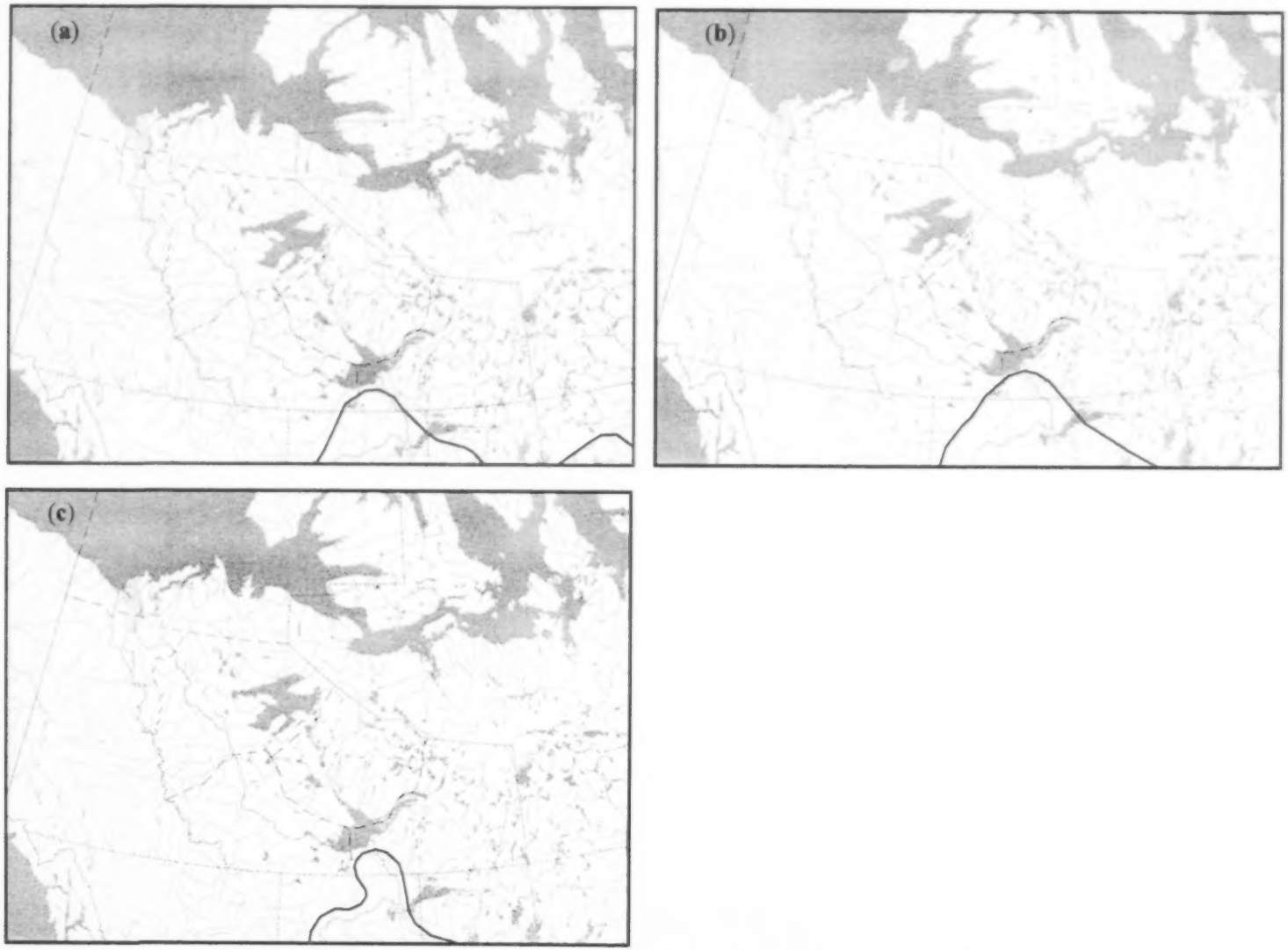

Figure 23. Previously published distributions of Fathead Minnow (*Pimephales promelas*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

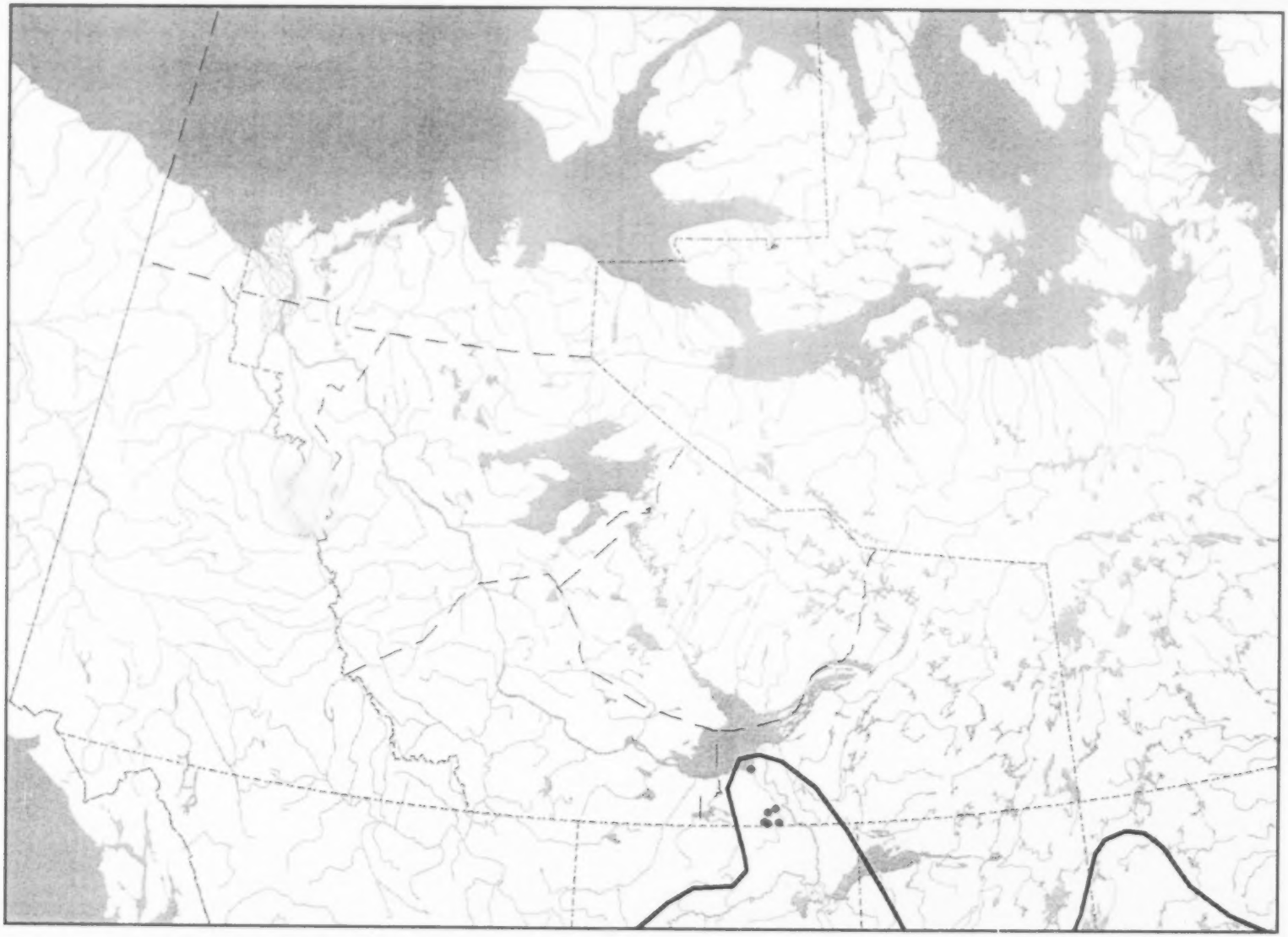

Figure 24. Revised distribution boundaries for Fathead Minnow (*Pimephales promelas*) based on point distributions and previously published boundaries.

Platygobio gracilis (Richardson 1836) [Figs. 25, 26]

Common Names: Flathead Chub (E), méné à tête plate (F) (Coad 2006).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: In the NT, the Flathead Chub is distributed throughout the Mackenzie River and Great Slave Lake. It is primarily a riverine species that occurs in large, fast flowing, turbid rivers. It is rarely found in ponds or lakes. The Flathead Chub occurs over rubble, gravel, sand, silt, and mud substrates (Wesche and Rechard 1980) at depths ranging from 0.15—2.5 m, and velocities between 0.005—1.5 m/s (Bovee 1974). In the Missouri and Yellowstone rivers of North Dakota, Flathead Chub were found to prefer shallow (<1 m), low velocity (<0.25 m/s), turbid habitats (Welker and Scarnecchia 2004). Sandbar areas were noted as important feeding and rearing habitats in the Missouri River, North Dakota (Fisher et al. 2002). Spawning occurs in spring and summer, possibly in streams (Evans et al. 2002).

Taxonomic Comments: Known in older literature as *Hybopsis gracilis*.

Distribution Comments: This species is not found in Alaska or NU, but may be present in the extreme southeastern YT based upon its occurrence in northeastern BC (Scott and Crossman 1973; Lee et al. 1980). The distribution boundary in the northeastern YT (Peel River basin) is uncertain and, based upon the geological history of this area (*i.e.*, originally connected to the Yukon River drainages), may not be appropriate even as an hypothesis.

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Figure 25. Previously published distributions of Flathead Chub (*Platygobio gracilis*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

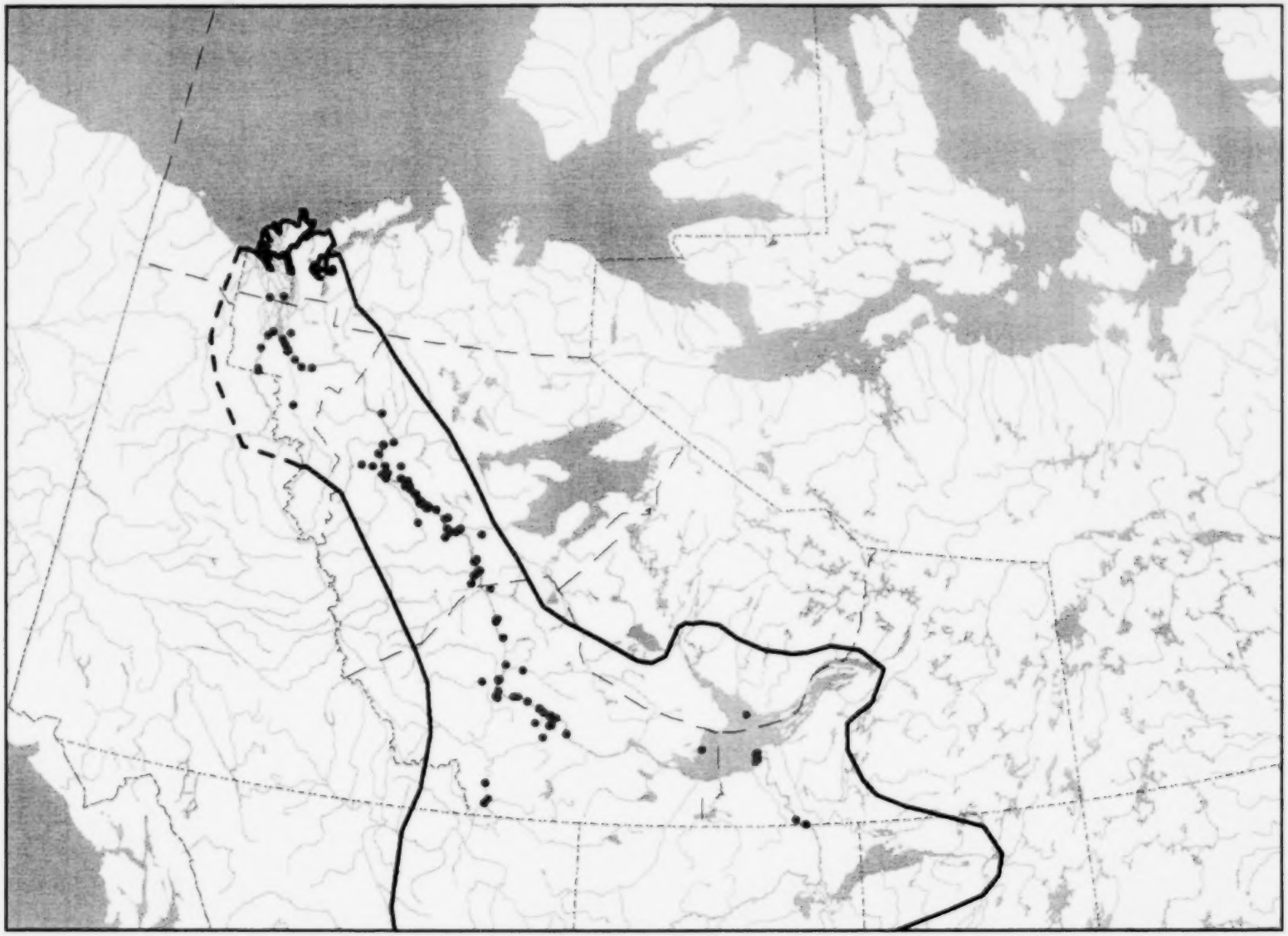

Figure 26. Revised distribution boundaries for Flathead Chub (*Platygobio gracilis*) based on point distributions and previously published boundaries.

Rhinichthys cataractae (Valenciennes 1842) [Figs. 27, 28]

Common Names: Longnose Dace (E), naseaux des rapides (F).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: Distributed throughout the Mackenzie River system in the NT, the Longnose Dace exhibits lacustrine and riverine life history types. This species typically occurs in fast flowing streams with a gravel or boulder substrate in clear or turbid water. It may also inhabit nearshore areas of lakes over a gravel or boulder substrate. Adults are nocturnal and may live between or under stones during the day. Spawning occurs between May and August over a gravel or stone substrate. Eggs hatch in 3—10 days depending on water temperature. Prolarvae remain near the substrate for approximately one week, then rise to the surface and may be found under overhanging vegetation. The young are pelagic for approximately four months, eventually becoming benthic. They are generally found in shallow water over a sand, gravel, and rock substrate. Juveniles and adults have similar habitat requirements, but adults are more selective (Richardson et al. 2001; Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: The Longnose Dace does not occur in Alaska or NU. It is likely present in the northeastern YT (Peel River basin) but this requires confirmation, and in the extreme southeastern YT based upon its occurrence in adjacent northeastern BC (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area for Longnose Dace was extended slightly north along the Mackenzie River to the confluence with the Peel River (Stein et al. 1973a).

Notes

Figure 27. Previously published distributions of Longnose Dace (*Rhinichthys cataractae*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

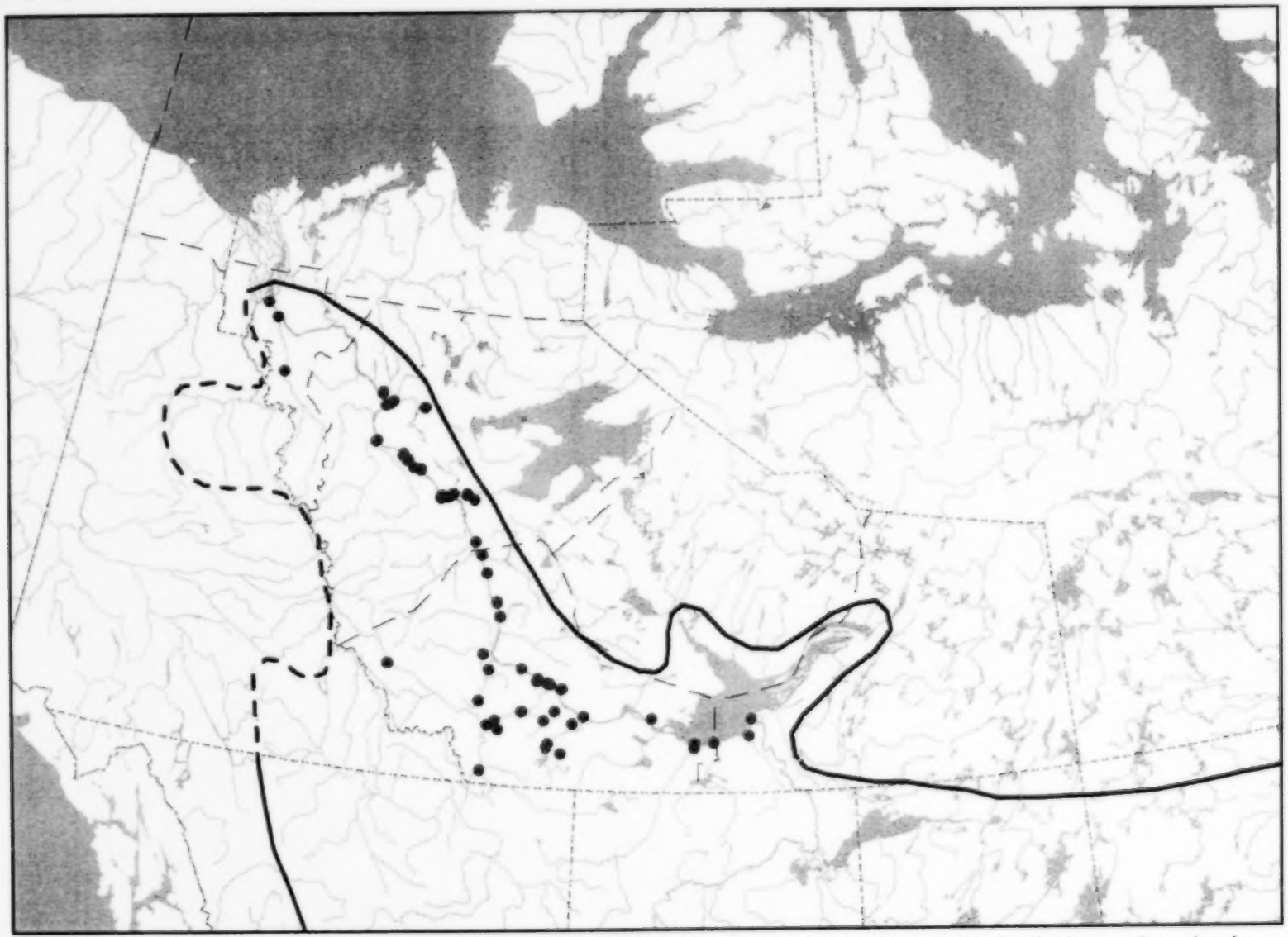

Figure 28. Revised distribution boundaries for Longnose Dace (*Rhinichthys cataractae*) based on point distributions and previously published boundaries.

Family 4. Catostomidae
[Suckers (E), Catostomes (F)] – 3 species.

Catostomus catostomus (Forster 1773) [Figs. 29, 30]

Common Names: Longnose Sucker (E), meunier rouge (F), milugiak (In, Tuktoyaktuk) (McAllister et al. 1987), dehdele (NS) (Bayha and Snortland 2004), dehdoo (DR), dehdorı (DR), kwìezìı (DR), kwìezhìı (DR) (Dogrib Divisional Board of Education 1996), sucker (E, local name) (Dogrib Divisional Board of Education 1996; Bayha and Snortland 2004).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: Widely distributed in the NT, Longnose Suckers exhibit adfluvial, riverine, and lacustrine life history types. Spawning occurs from April to June primarily in rivers and less often in the shallows of lakes (Richardson et al. 2001; Evans et al. 2002). In lakes, Longnose Suckers spawn at depths of 0.15—0.3 m over gravel and sand substrates along rocky shorelines (Richardson et al. 2001). Riverine spawning habitat includes large rocks (10—50 cm in diameter) or sand and gravel (<1 cm in diameter), depths between 0.15—0.54 m, and velocities between 0.25—1 m/s (Evans et al. 2002). In rivers and lakes, spawning occurs during the day. Eggs and milt are broadcast and the fertilized eggs adhere to the substrate where they incubate for 7—15 days depending on water temperature. Young remain in the gravel substrate for 1—2 weeks (Richardson et al. 2001; Evans et al. 2002). Lacustrine young and juveniles are frequently found in association with vegetation in shallow areas with sandy substrates (Richardson et al. 2001). Riverine young migrate downstream in fast-flowing water and typically occur at or near the surface (Evans et al. 2002). Lacustrine adults usually inhabit depths up to 24 m, but have been found as deep as 183 m (Richardson et al. 2001). Riverine adults remain in the river after spawning and are found in slow moving areas. Adfluvial adults move into lakes and rivers downstream of the spawning area to feed (Evans et al. 2002).

Taxonomic Comments: Local fishers usually do not differentiate between the two sucker species in this area which accounts for the use of the same local common names.

Distribution Comments: This species is found throughout Alaska (Mecklenburg et al. 2002), the YT, and in the southern Kitikmeot and Kivalliq areas of NU (Scott and Crossman 1973; Lee et al. 1980). The northern NU distribution boundary was modified based on Sutherland and Golke (1978) and MacDonald and Stewart (1980).

Notes

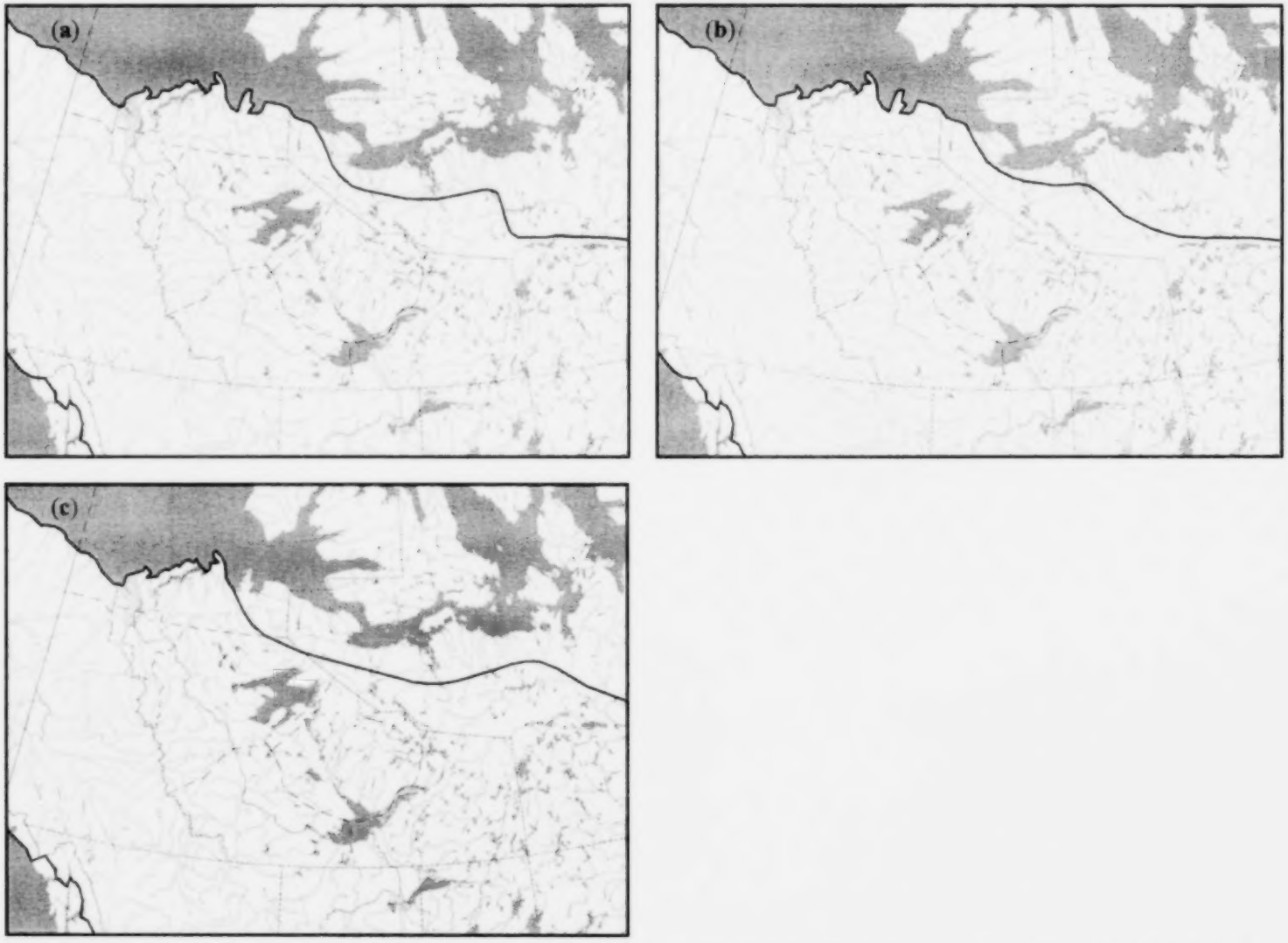

Figure 29. Previously published distributions of Longnose Sucker (*Catostomus catostomus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

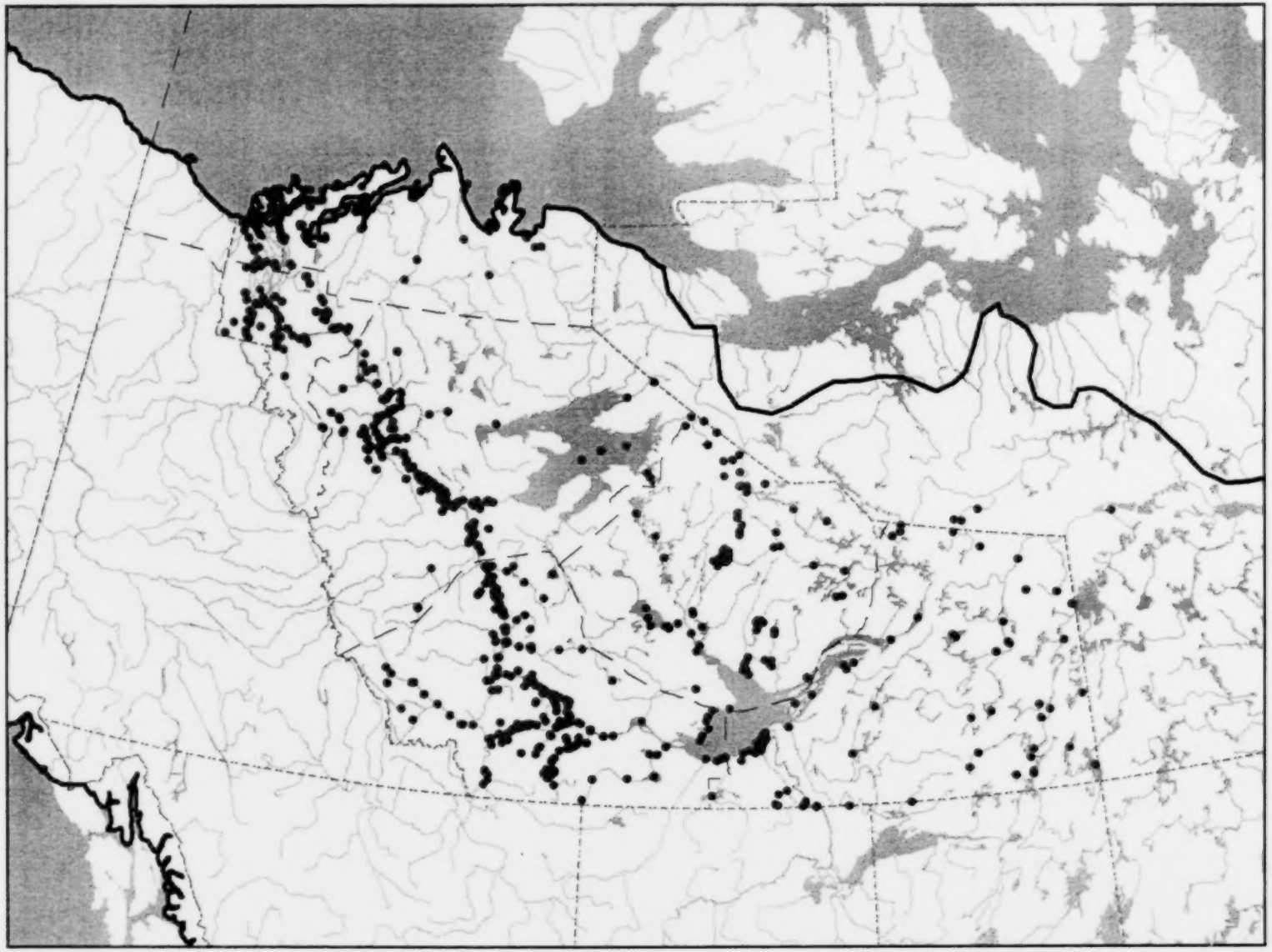

Figure 30. Revised distribution boundaries for Longnose Sucker (*Catostomus catostomus*) based on point distributions and previously published boundaries.

Catostomus commersonii (Lacepède 1803) [Figs. 31, 32]

Common Names: White Sucker (E), meunier noir (F), dehdele (NS) (Bayha and Snortland 2004), dehdoo (DR), dehdorı (DR), Kwìezìı (DR), Kwìezhìı (DR) (Dogrib Divisional Board of Education 1996), sucker (E, local name) (Dogrib Divisional Board of Education 1996; Bayha and Snortland 2004).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: Common throughout the Mackenzie River system, White Suckers exhibit lacustrine, adfluvial, and riverine life history types. Spawning occurs from May to June in inlet streams (preferred), rivers, and lakes (Richardson et al. 2001; Evans et al. 2002). No information was available on lacustrine spawning habitat. In rivers, spawning takes place over large rocks (10—50 cm in diameter) at depths between 0.15—1 m and velocities of 0.22—1 m/s (Evans et al. 2002). In both lakes and rivers, the fertilized eggs adhere to the substrate and incubate for 8—15 days depending on water temperature (Richardson et al. 2001; Evans et al. 2002). Spawning generally occurs at night (Evans et al. 2002).

Young remain in the gravel substrate for 1—2 weeks after hatching (Richardson et al. 2001; Evans et al. 2002). Lacustrine young inhabit shallow waters along the shore over substrates of rock and sand and are often found in association with vegetation. They move to deeper offshore waters later in the summer (Richardson et al. 2001). Riverine young are typically found near the surface in fast flowing water 0.15—0.2 m deep. As their mouths become increasingly ventral they begin to seek food on the bottom (Evans et al. 2002).

Lacustrine adults inhabit depths of 7—13 m (Richardson et al. 2001). Adfluvial adults return to the lake 10—14 days after spawning. Riverine adults inhabit clear to turbid, sparsely vegetated water, and are found at depths up to 1.5 m over substrates of gravel, sand, silt, rubble, and mud. Young fish may overwinter in tributary streams, while older fish overwinter in lakes (Evans et al. 2002).

Taxonomic Comments: Local fishers usually do not differentiate between the two sucker species in this area which accounts for the use of the same local common names.

Distribution Comments: The White Sucker does not occur in Alaska; it is present in the southeastern YT (Scott and Crossman 1973; Lee et al. 1980), and likely occurs in the southern Kivalliq area of NU. The NT distribution area for White Sucker was extended east to include Great Bear Lake (Johnson 1966) and Beverly Lake on the Hanbury River (Canadian Museum of Nature 2005). The distribution boundary in northern Manitoba was modified based on Stewart and Watkinson (2004).

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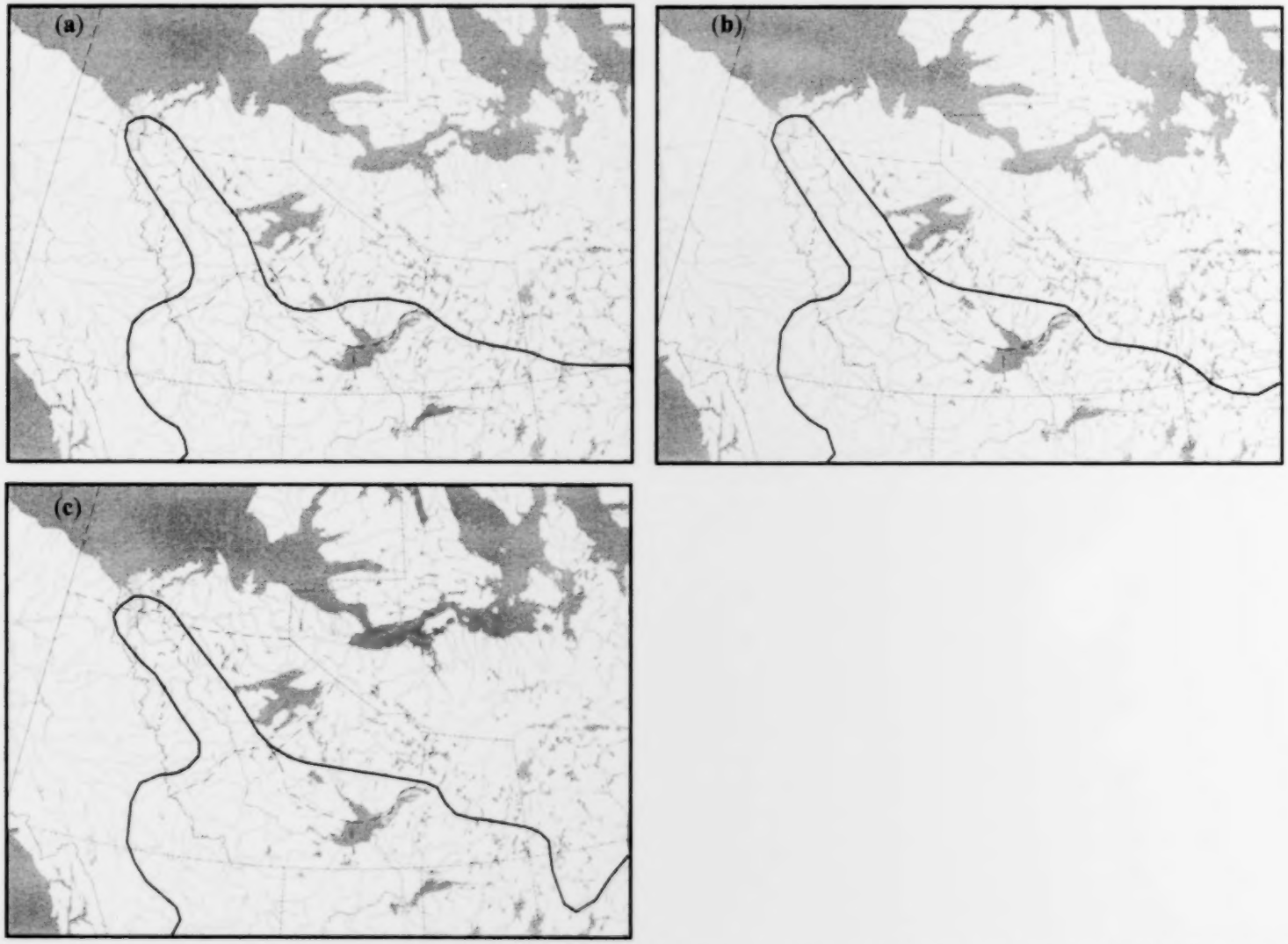

Figure 31. Previously published distributions of White Sucker (*Catostomus commersonii*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

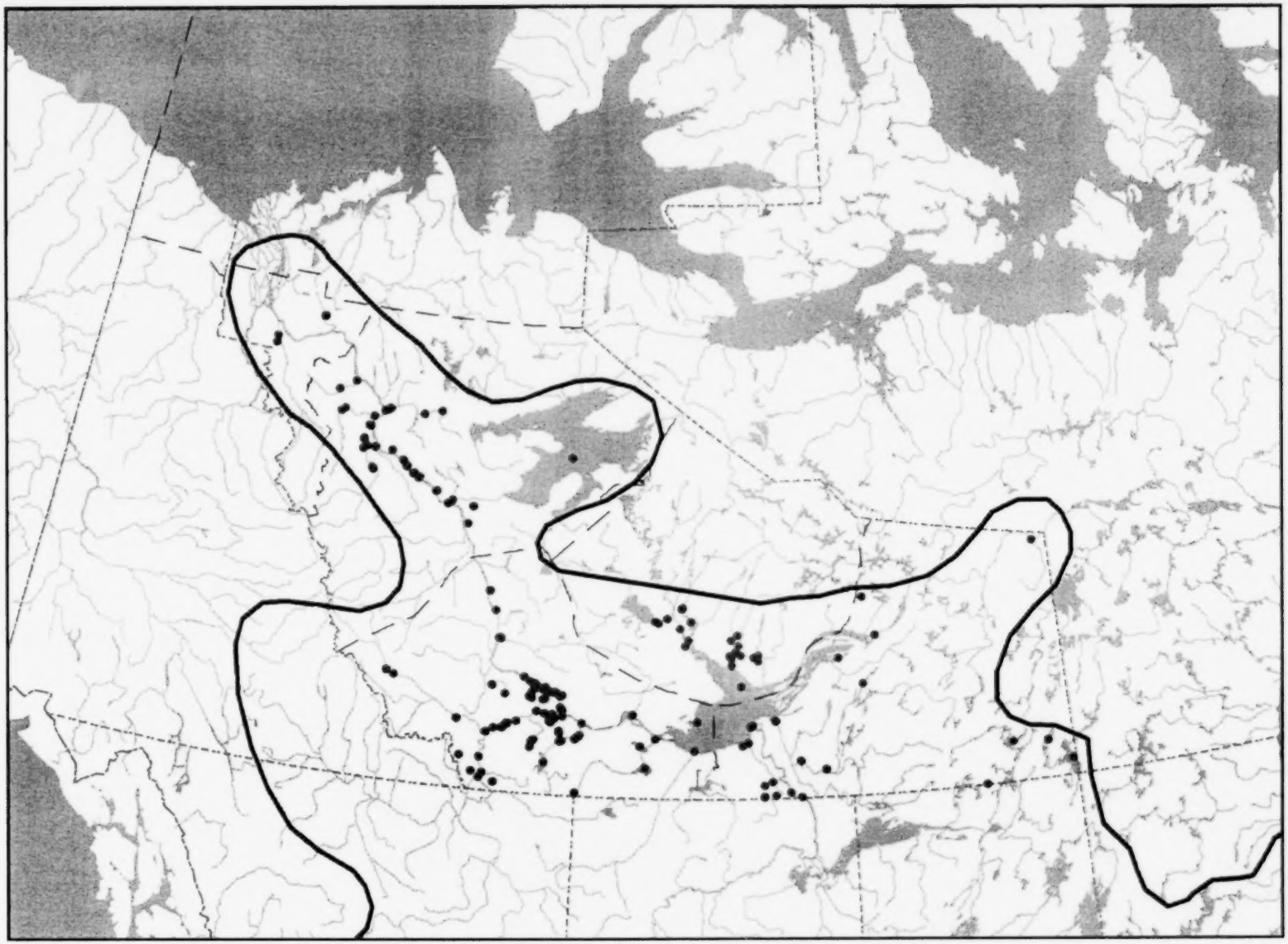

Figure 32. Revised distribution boundaries for White Sucker (*Catostomus commersonii*) based on point distributions and previously published boundaries.

Catostomus macrocheilus Girard 1856 [Figs. 33, 34]

Common Names: Largescale Sucker (E), meunier à grands écailles (F) (Coad 2006).

Conservation Status: Not assessed.

Habitat: Rare in the NT, the Largescale Sucker exhibits lacustrine and riverine life history types. Spawning occurs in spring, frequently in lake outlets and occasionally in inlet streams and along lake margins. Deep areas with sand substrates are preferred for spawning. Fertilized eggs adhere to the substrate and hatch in about two weeks (McPhail and Lindsey 1970). Fry remain in the gravel or on the surface of the sand for their first few weeks. Young are pelagic until their mouths become ventral, at which time they move to the bottom. Adults usually prefer shallower water, but have been found as deep as 27 m. They inhabit weedy lake shores, backwaters, and stream mouths (Scott and Crossman 1973). Slow moving areas of large rivers and streams are preferred (Lee et al. 1980).

Taxonomic Comments: None.

Distribution Comments: The Largescale Sucker is not present in NU. The NT distribution area for Largescale Sucker was provisionally extended north to include the confluence of the Blackstone and Liard rivers based upon one record from the Royal British Columbia Museum (accessed from Froese and Pauly 2006). McPhail (2007) indicates that Largescale Sucker do not occur in Liard River drainages of northeastern BC. This prompted a review of the voucher specimen available for the point illustrated in Figure 34. Re-examination of this specimen by staff at the Royal British Columbia Museum indicated it is most likely a White Sucker (*C. commersonii*) (G. Hanke pers. comm. 2007). We have provisionally left this species and questionable identification in this report to highlight the issue of field identifications versus those supported by voucher specimens, and to stimulate further close examination of fish faunas of southern NT. Assuming this species is not present in NT, then the numbers indicated in the results (p. 5) and Table 1 should be reduced by n=1 species.

Notes

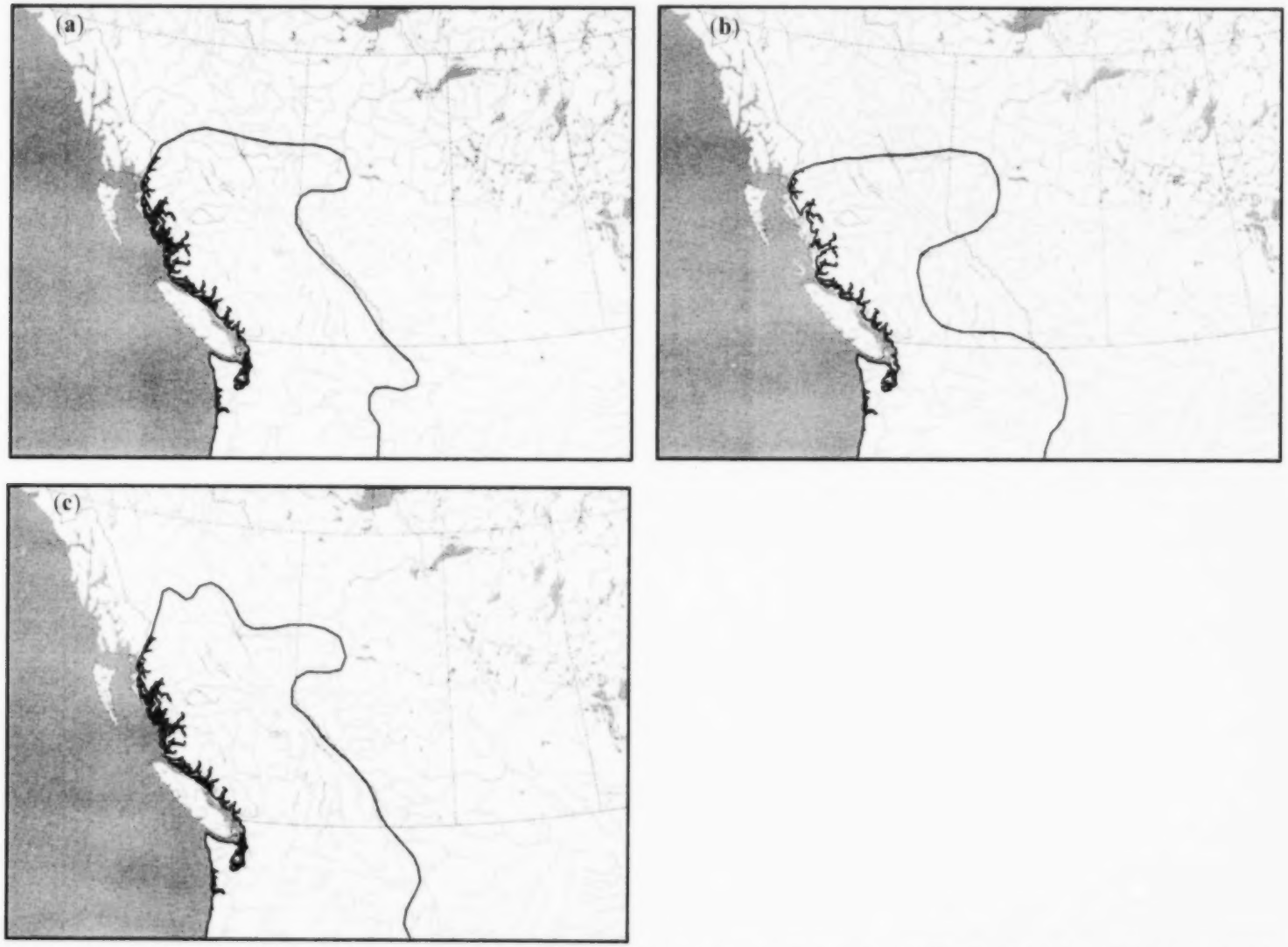

Figure 33. Previously published distributions of Largescale Sucker (*Catostomus macrocheilus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

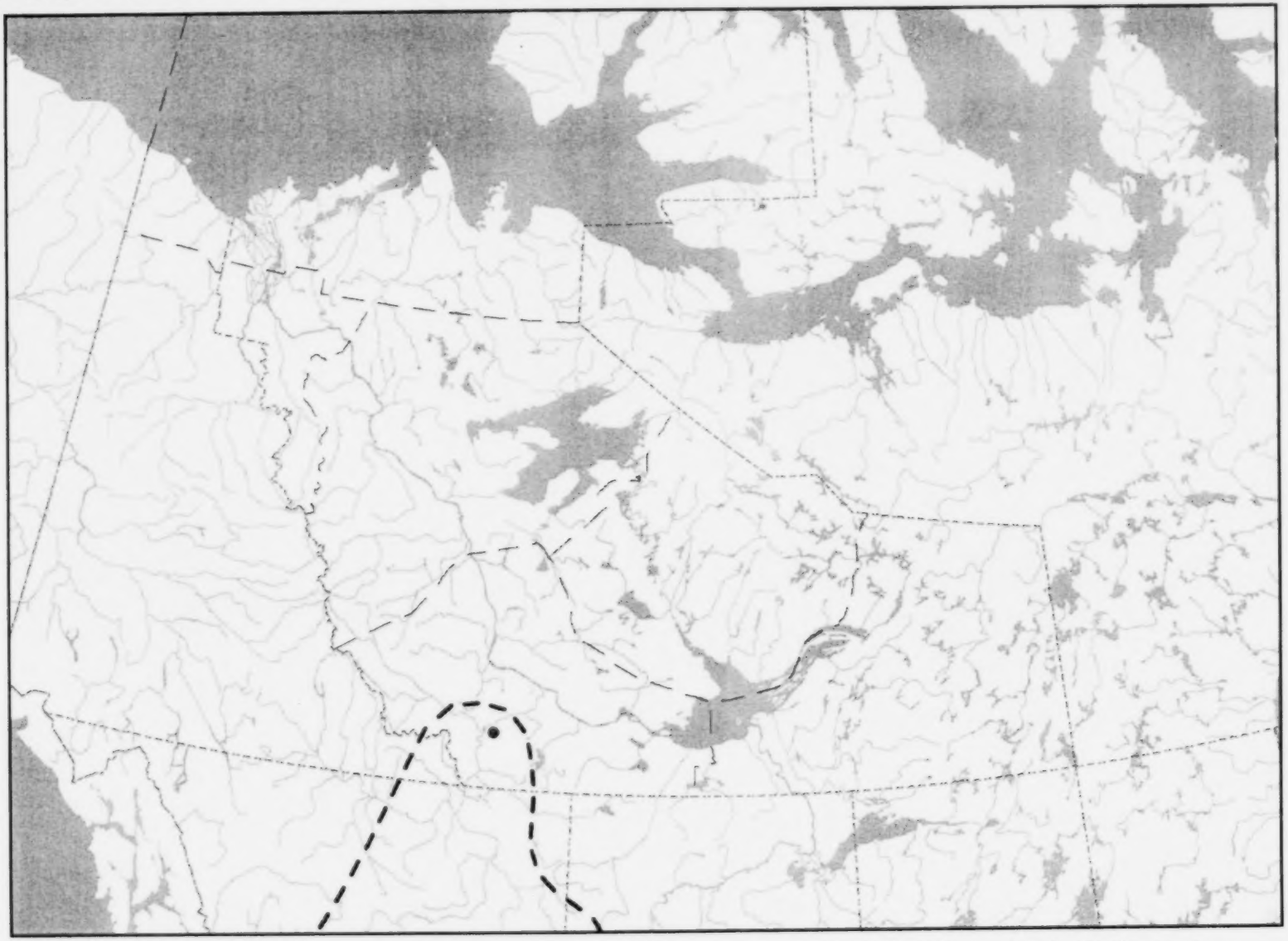

Figure 34. Revised distribution boundaries for Largescale Sucker (*Catostomus macrocheilus*) based on point distributions and previously published boundaries.

Family 5. Esocidae
[Pikes (E), Brochets (F)] – 1 species.

Esox lucius Linnaeus 1758 [Figs. 35, 36]

Common Names: Northern Pike (E), grand brochet (F), sjulik (In, Tuktoyaktuk) (McAllister et al. 1987), siulik (Inv) (The Community of Aklavik et al. 2000), hiulik (Inv) (D. McGowan pers. comm. 2006), eltin (GW) (VanGerwen-Toyne 2002), æõhda (NS) (Bayha and Snortland 2004), Ɫhdaa (DR) (Dogrib Divisional Board of Education 1996), jackfish (E, local name) (Dogrib Divisional Board of Education 1996; The Community of Aklavik et al. 2000; VanGerwen-Toyne 2002; Bayha and Snortland 2004).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: Widely distributed in the NT, Northern Pike exhibit riverine, adfluvial, and lacustrine life history types. This species occurs in weedy slow rivers and, more frequently, weedy bays of lakes. In northern areas, spawning occurs from May to June in rivers, streams, ditches, marshes, and inshore and offshore areas of vegetated regions of lakes (Richardson et al. 2001; Evans et al. 2002). In lakes, Northern Pike typically spawn in vegetated waters <1 m deep in sheltered areas over substrates of fine silt and mud. Spawning may also occur over gravel, rock, boulder, and cobble substrates (Richardson et al. 2001). Riverine and adfluvial Northern Pike spawn in tributary mouths of the Mackenzie River in areas with emergent vegetation, water temperatures ranging from 4–16°C, and at depths <0.3 m. Northern Pike are not adapted for strong currents (>1.5 m/s) and these may block spawning migrations. Spawning occurs over a vegetative detritus or mud substrate (Evans et al. 2002).

After hatching, the young attach to vegetation until the yolk sac has been absorbed and then remain in the spawning area for several weeks (Richardson et al. 2001; Evans et al. 2002). Lacustrine young are found in vegetated areas with soft substrates, typically in water <1 m deep, however they often move to deeper water in summer (Richardson et al. 2001). Riverine and adfluvial young occur in densely vegetated areas in back eddies or at tributary mouths. They often emigrate from their natal streams, beginning in mid-July, into slower water and vegetated areas of the main river (Evans et al. 2002). Lacustrine juveniles are typically found in sheltered bays in association with submerged vegetation (Richardson et al. 2001). Riverine juveniles are generally found in water <2 m deep in vegetated areas over substrates of mud and silt (Evans et al. 2002).

Adults are ambush predators that require cover (logs, weeds, stumps, etc.) to capture prey and are more active during the day (Richardson et al. 2001; Evans et al. 2002). Lacustrine adults typically occur in water <5 m deep, except during winter, when they are found in deeper water. Adults frequent moderately vegetated areas in open water with soft substrates but have been found over gravel, cobble, and boulders (Richardson et al. 2001). After spawning, riverine and adfluvial adults may remain in the spawning stream or return to the associated lake or river. Adults are often found in vegetated, shallow areas of rivers that lack a current over substrates of mud and silt. Northern Pike can tolerate low salinity

and are occasionally caught in freshened areas of Wood Bay and the Mackenzie Delta and adjacent coastal areas (Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: The Northern Pike is widespread throughout Alaska (Mecklenburg et al. 2002), the YT, and the southern Kitikmeot and Kivalliq areas of NU (Scott and Crossman 1973; Lee et al. 1980).

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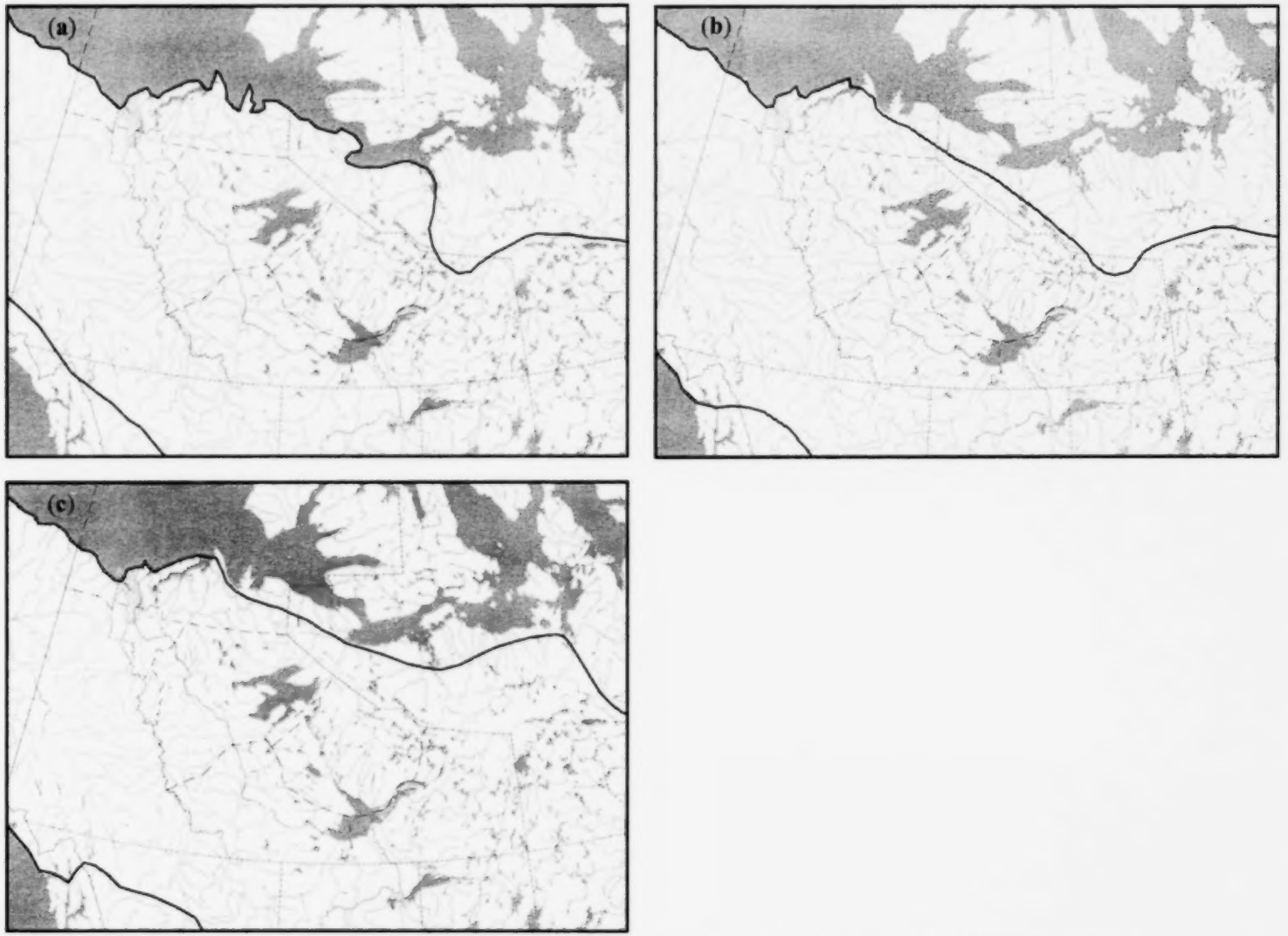

Figure 35. Previously published distributions of Northern Pike (*Esox lucius*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

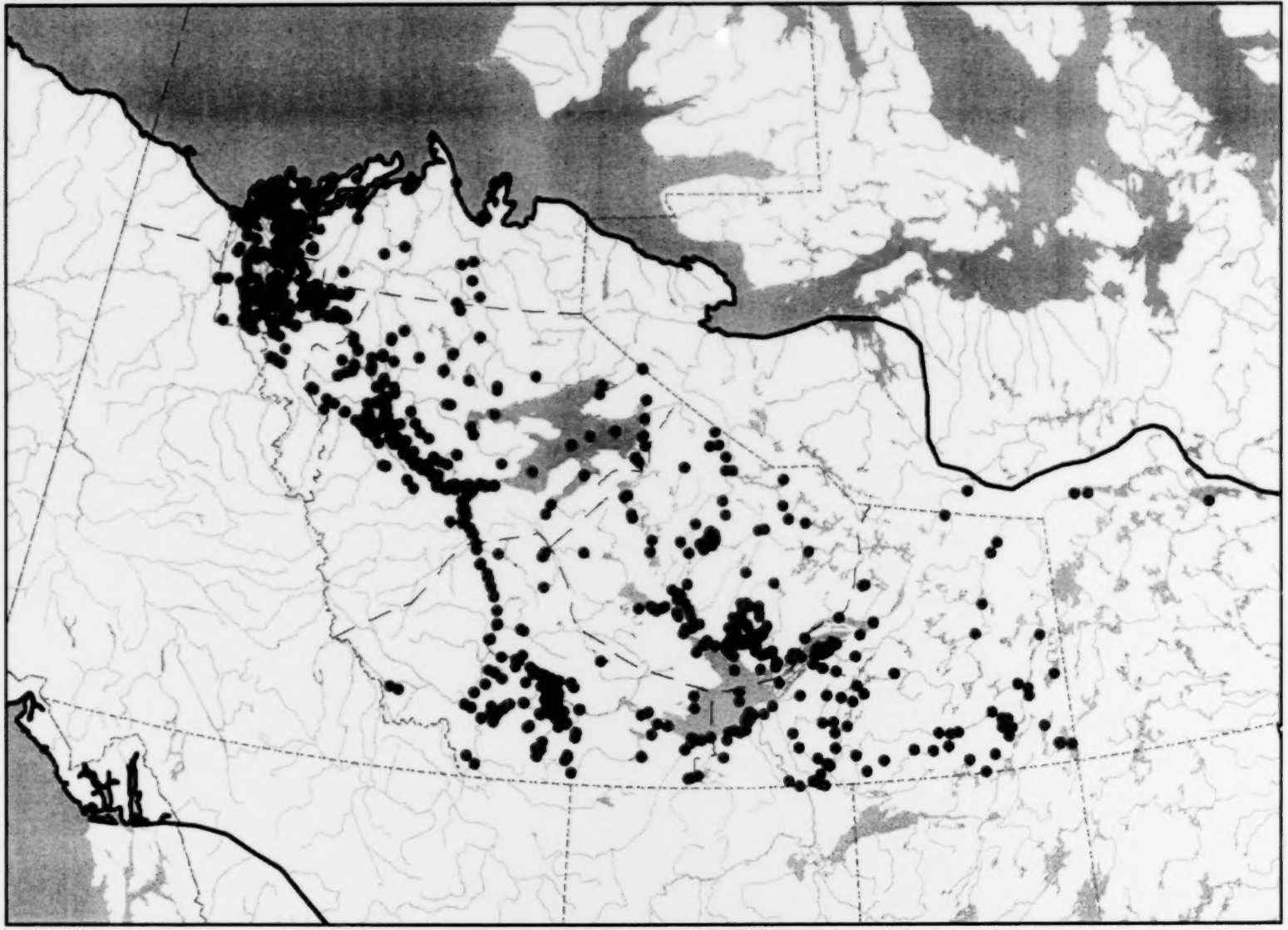

Figure 36. Revised distribution boundaries for Northern Pike (*Esox lucius*) based on point distributions and previously published boundaries.

Family 6. Osmeridae
[Smelts (E), Éperlans (F)] – 2 species.

Hypomesus olidus (Pallas 1814) [Figs. 37, 38]

Common Names: Pond Smelt (E), éperlan à petite bouche (F) (Coad 2006).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: Distributed mainly in the northern portion of the Mackenzie River system, Pond Smelt exhibit riverine and lacustrine life history types. Limited information is available on the habitat requirements of this species. Spawning occurs in June and July (Richardson et al. 2001; Evans et al. 2002). Lacustrine Pond Smelt spawn in littoral areas over a substrate of organic debris (Richardson et al. 2001). In rivers, spawning may occur at water velocities up to 0.7–0.8 m/s and at depths <1 m (Evans et al. 2002). Lacustrine young are generally found over a sand substrate, but may also occur over cobble and boulder substrates, organic detritus, and macrophytes (Richardson et al. 2001). In Alaska, riverine juveniles were caught over mud and sand substrates (Platts and Millard 1995). Lacustrine adults are pelagic and may exhibit diel inshore-offshore movements (Richardson et al. 2001).

Taxonomic Comments: None.

Distribution Comments: The Pond Smelt occurs in coastal drainages of Alaska (Mecklenburg et al. 2002), along the YT North Slope (Scott and Crossman 1973; Lee et al. 1980), and perhaps also in inland areas of the Peel River system; it has been recorded from the Rae River in NU (Sutherland and Golke 1978). The NT distribution was modified to include the Liard River (Griffiths et al. 1974). The northern NU distribution was modified to include the Rae River (Sutherland and Golke 1978).

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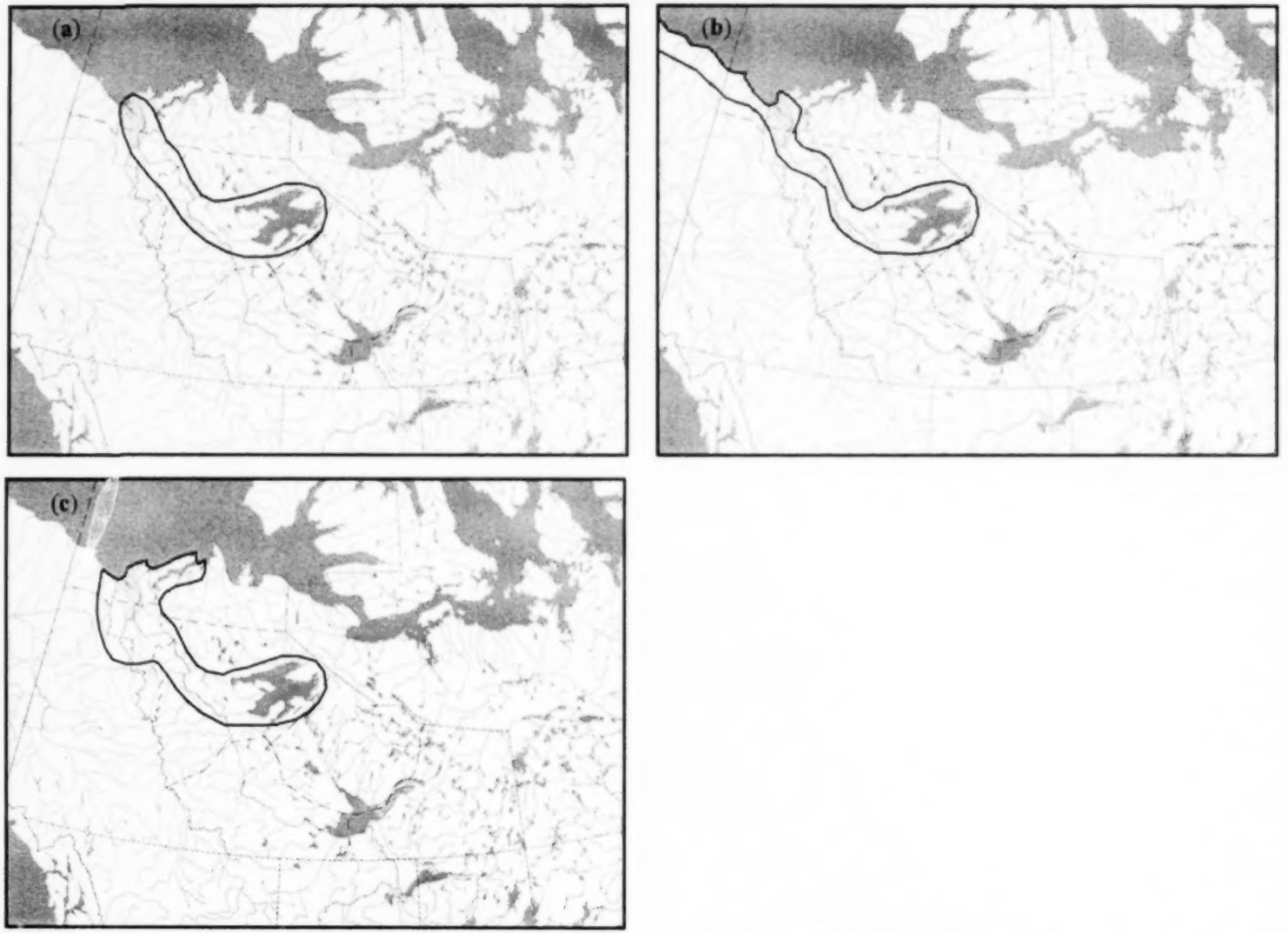

Figure 37. Previously published distributions of Pond Smelt (*Hypomesus olidus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

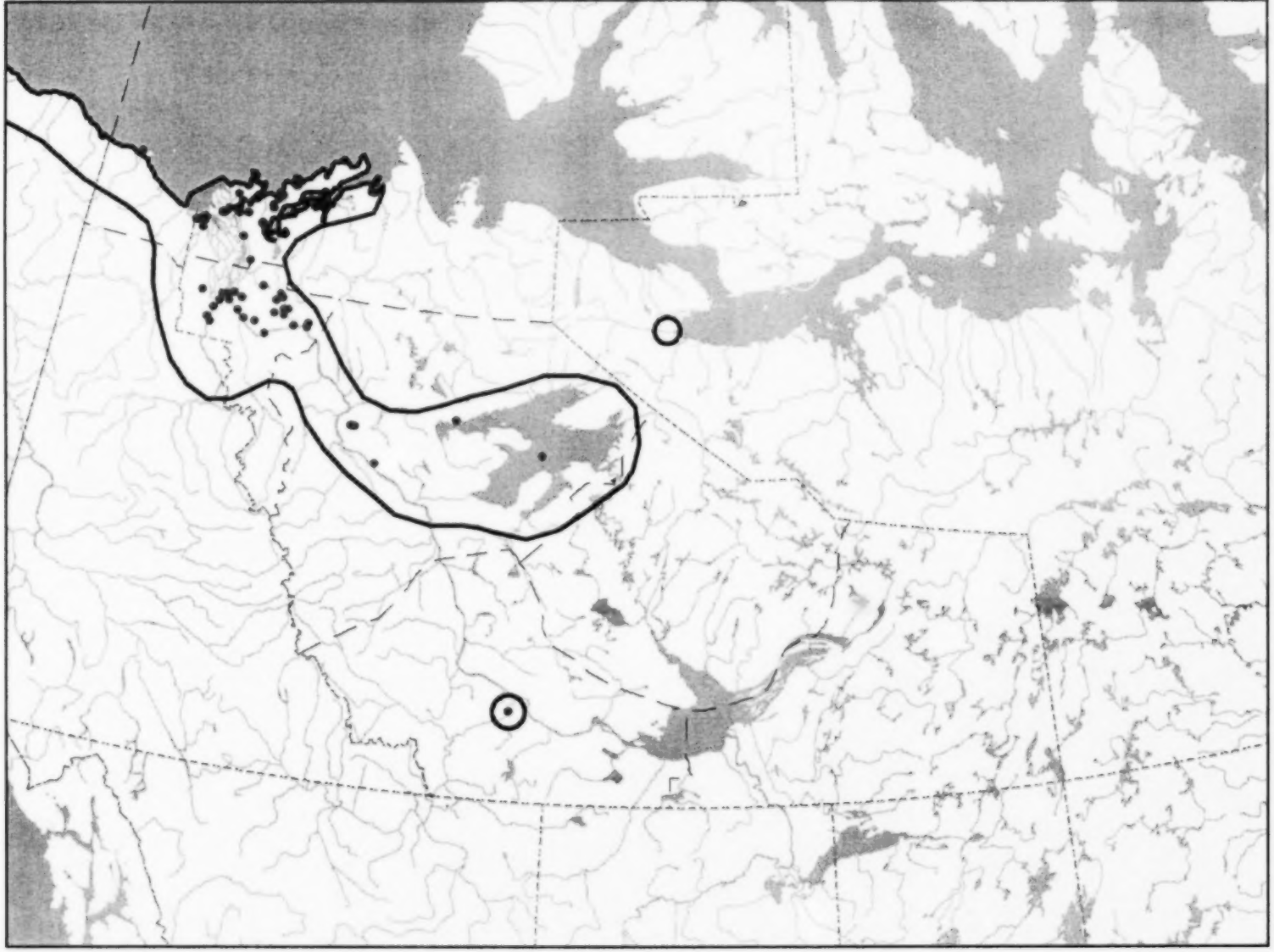

Figure 38. Revised distribution boundaries for Pond Smelt (*Hypomesus olidus*) based on point distributions and previously published boundaries.

Osmerus mordax (Mitchill 1814) [Figs. 39, 40]

Common Names: Rainbow Smelt (E), éperlan arc-en-ciel (F).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: Distributed throughout the Mackenzie Delta, the Rainbow Smelt exhibits anadromous, freshwater-resident lacustrine, and adfluvial life history types. The anadromous fish spawn in lower reaches of streams and rivers above the head of the tide. In southern populations, spawning occurs from April to May. This species generally spawns at night over sand, gravel, and rock substrates at depths of 0.1—1.3 m. Spawning may take place in association with vegetation. If the weather is extremely stormy during the spawning run, offshore gravel shoals are used instead. After hatching, larvae drift downstream into estuaries. During the day larvae occur 1—1.5 m above gravel and sand substrates in water 11—12 m deep and may be found in association with eelgrass beds. Juveniles and adults are typically found in water >6 m deep. They may remain in estuaries throughout the summer or migrate to coastal areas, never venturing further than 2 km offshore. They return to the estuaries in fall to overwinter.

Freshwater-resident Rainbow Smelt have not been reported from the NT. Spawning occurs in inshore and offshore areas of lakes and in rivers. Eggs are released over boulder, rubble, cobble, gravel, sand, mud, silt, or clay substrates in water 0.1—5 m deep. Larvae migrate from shallow water (2—4 m) during the day to deeper water (>15 m) at night, congregating 2—3 m above the bottom. Young are often found inshore over gravel and sand beaches. Juveniles typically occur at mid-water depths while adults are found closer to the bottom at depths >10 m during the day or near the surface at night (Richardson et al. 2001).

Taxonomic Comments: Variously known in western North America as a species (*O. mordax*) or subspecies (*O. m. dentex*) distinct from Atlantic forms (*O. eperlanus* and variants). It is now considered to be one species consisting in the Canadian Arctic of two disjunct subspecies (Coad and Reist 2004). Some combination of these names may be used in older literature.

Distribution Comments: The Rainbow Smelt occurs in coastal drainages and nearshore marine areas of Alaska (Mecklenburg et al. 2002), the YT North Slope, and the western Kitikmeot area of NU (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area was extended south along the Mackenzie River to include Great Bear Lake (Royal Ontario Museum 2006).

Notes

Figure 39. Previously published distributions of Rainbow Smelt (*Osmerus mordax*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

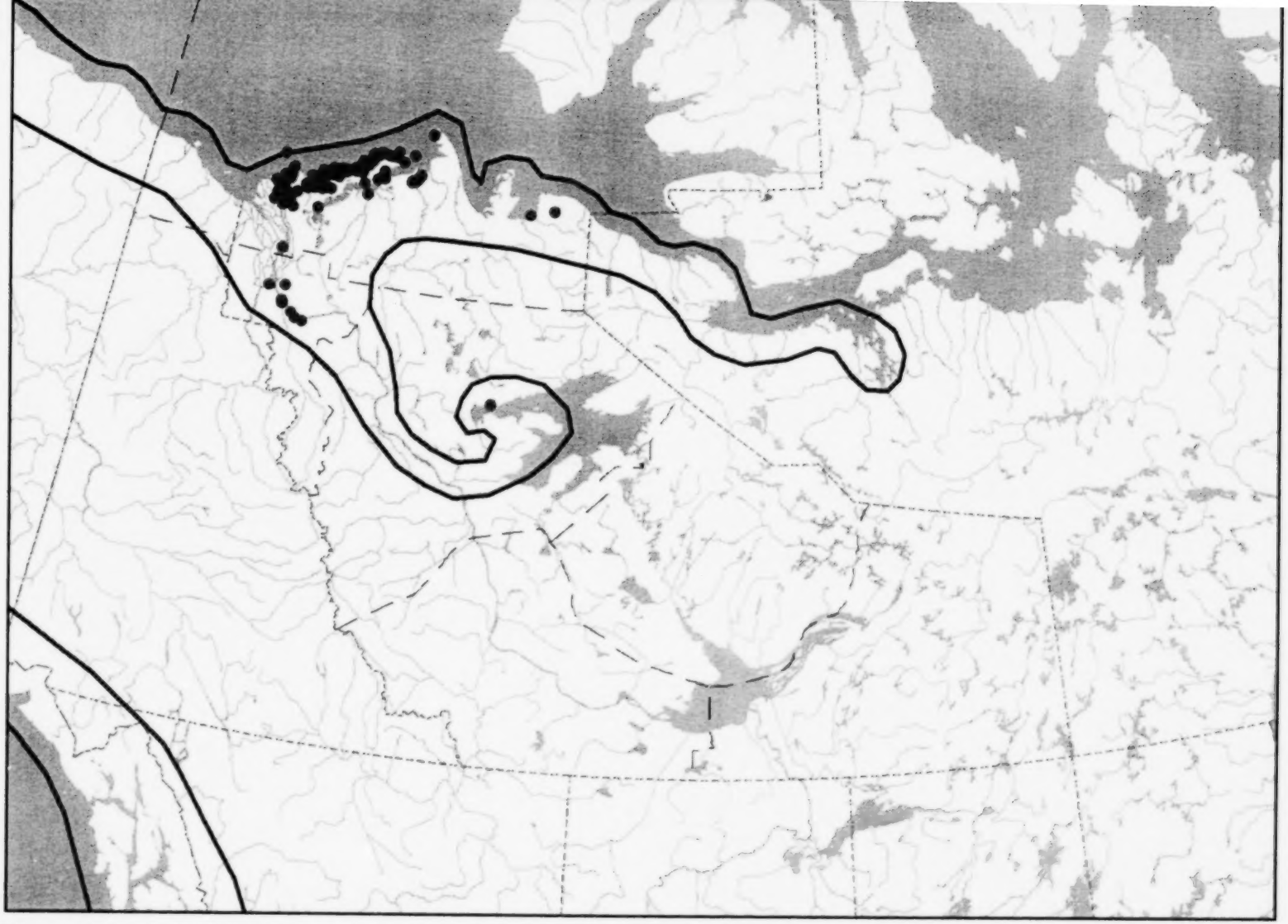

Figure 40. Revised distribution boundaries for Rainbow Smelt (*Osmerus mordax*) based on point distributions and previously published boundaries.

Family 7. Salmonidae
[Trouts and Salmons (E), Truites et Saumons (F)] – 24 species.

Coregonus artedi Lesueur 1818 [Figs. 41, 42]

Common Names: Cisco (E), cisco de lac (F), arnaqsleq (In, Thelon and Back rivers) (McAllister et al. 1987), åuehya (NS), lugeya (NS) (Bayha and Snortland 2004).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: Widely distributed in the NT, the Cisco is primarily lacustrine, although it may also be found in larger rivers (Richardson et al. 2001; Evans et al. 2002). River habitat requirements are not known (Evans et al. 2002). Spawning occurs in lakes in the fall, most often over sand and gravel substrates and occasionally over boulders, rubble, clay, mud, and vegetation. Cisco are generally shallow-water spawners (1—5 m), but have also been known to spawn at depths between 120—140 m. Eggs hatch in spring before ice breakup. Young often inhabit shallow waters of protected bays over rocky substrates and are usually associated with vegetation. They school with whitefish in these areas until they are approximately one month old. By summer they move to deeper water and become pelagic. They are typically found at depths of 10—60 m, moving from shallow waters in spring to deeper waters in summer. Diel migrations are also made away from shore at sunrise and toward shore at sunset (Richardson et al. 2001).

Taxonomic Comments: The common name of Lake Cisco has been dropped and this species is now known only as Cisco (Nelson et al. 2004). This species is an inland taxon reaching its extreme northwestern limit in the Mackenzie River delta. In this area co-occurrence with Least Cisco (*C. sardinella*) and Arctic Cisco (*C. autumnalis*) may occur, especially in riverine habitats. Careful identification is necessary and riverine coastal reports for this species require confirmation. This circumstance is further complicated in that inland lacustrine reports of Least Cisco are known, and where they occur in larger and more complex lakes, Cisco almost always diversify into more than one ecological form, some of which may show character convergence with other species of Ciscoes.

Distribution Comments: The Cisco does not occur in Alaska. There have been some reports from the YT, but these require confirmation (Coad et al. unpubl. 2006); it is present in the southwestern Kitikmeot and Kivalliq areas of NU (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area for Cisco was extended south to include the Liard River, Trainor Lake, and Trout Lake (McCart et al. 1974; O'Neil et al. 1982). The distribution area extending to the north is considered uncertain. It includes the Anderson River, Baillie Islands (Preble 1908; Anderson 1913; Caulkin 1937; Fisheries Research Board of Canada 1959; Withler 1975), Taylor Channel, Anderson River delta (University of British Columbia Fish Collection 2005; University of Alberta Museum of Zoology 2005; Royal Ontario Museum 2006), and Brock River (Gillman et al. 1985). A segment of the northern NU distribution was extended to the coast (MacDonald and Stewart 1980).

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Figure 41. Previously published distributions of Cisco (*Coregonus artedi*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

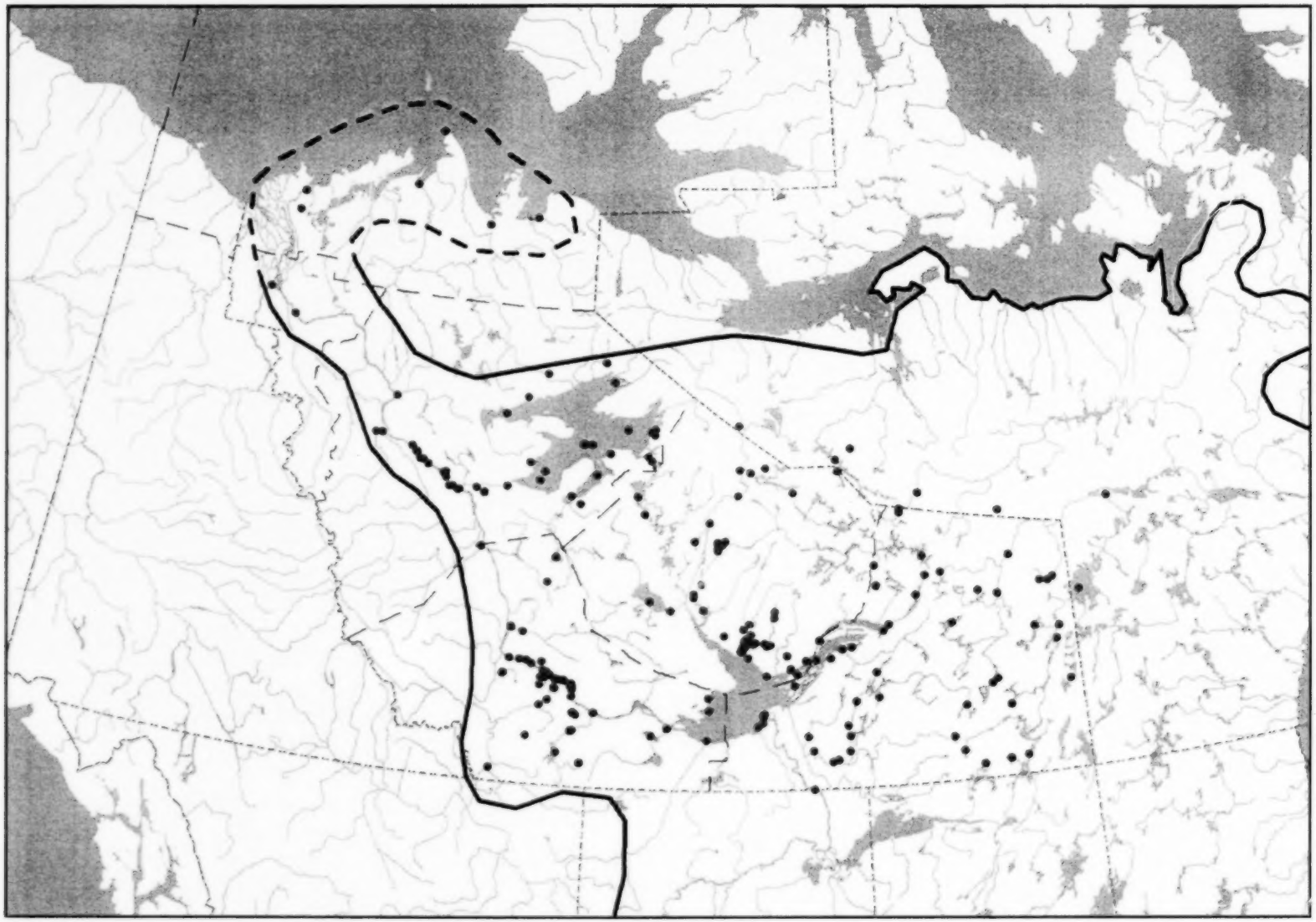

Figure 42. Revised distribution boundaries for Cisco (*Coregonus artedi*) based on point distributions and previously published boundaries.

Coregonus autumnalis (Pallas 1776) [Figs. 43, 44]

Common Names: Arctic Cisco (E), cisco arctique (F) (Coad 2006), kaktak (In, Mackenzie Delta), kraaktak (In, Tuktoyaktuk) (McAllister et al. 1987), qaluhaq (Inv), armagiak (Inv), anmaglak (Inv) (D. McGowan pers. comm. 2006), treeluk (GW) (Gwich'in Renewable Resource Board 1997; VanGerwen-Toyne 2002), åuehya (NS), lugeya (NS) (Bayha and Snortland 2004), Arctic herring (E, local name) (Gwich'in Renewable Resource Board 1997), herring (E, local name) (VanGerwen-Toyne 2002).

Conservation Status: Regional: Sensitive (Working Group on General Status of NWT Species 2006).

Habitat: In the NT, the Arctic Cisco inhabits coastal regions and the Mackenzie River system south to the Liard River. This species exhibits an anadromous life history type, although it is believed that part of the population in the Liard River is non-anadromous (Dillinger et al. 1992). Within the NT, spawning occurs from late September to early October in the Peel, Arctic Red, Great Bear, Mountain, and Carcajou rivers (Evans et al. 2002). Spawning takes place over gravel substrates in fast flowing waters with low turbidity (Richardson et al. 2001). Eggs hatch in spring and young remain near the spawning grounds until ice out. They reach the Mackenzie River by late spring and are swept downstream into the delta. From here they move east and west along the coastline driven by nearshore marine conditions. In the NT, they may be found along the Tuktoyaktuk Peninsula, in shallow lakes of the Mackenzie Delta or at the mouth of the Anderson River. They remain in nursery areas (*e.g.*, Colville River, Alaska; Anderson River) until maturity is reached (7–8 years), at which time they return to the Mackenzie River. Juveniles inhabit brackish to near marine, shallow, relatively warm, turbid waters during the summer. Overwintering of juveniles is thought to occur in the Anderson River (Evans et al. 2002).

Adults migrate back down the Mackenzie River after spawning. They are common in the lower reaches of turbid rivers and in brackish waters. In coastal areas, they inhabit both nearshore and offshore waters in the summer (Evans et al. 2002). Off the coast of Alaska, Arctic Cisco have been found at water temperatures between 1.2–7.4°C in the top 6 m of the water column (Jarvela and Thorsteinson 1997).

Taxonomic Comments: See comments for Cisco (*C. artedi*). Local fishers do not usually distinguish between Cisco species, rather referring to them as a group. Thus, overlap in local common names occurs.

Distribution Comments: This Arctic coastal species is widespread along northwestern areas extending along the North Slope of Alaska west to the Colville River (Mecklenburg et al. 2002). In this area, a closely related species, *C. laurettae* (Bering Cisco), occurs and extends westwards. Despite persistent reports of the latter in Canadian waters there are no confirmed records, so these fish are almost certainly Arctic Cisco. Along the North Slope of the YT, this species does not appear to penetrate inland past the coastal plain and nearshore marine waters (Scott and Crossman 1973; Lee et al. 1980). Inland and southern reports of this species in the YT require confirmation and may represent Bering Cisco. The

Arctic Cisco occurs in eastern coastal regions of the Kitikmeot area of NU (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area for Arctic Cisco was extended to the southern border of the NT (McCart et al. 1974; O'Neil et al. 1982) and west to the Mountain River area (Hanks et al. 1989).The northeastern NU distribution boundary was modified based on Stewart and Bernier (1983) and an area in the vicinity of Hadley Bay on Victoria Island was added (D.B. Stewart pers. comm. 2007).

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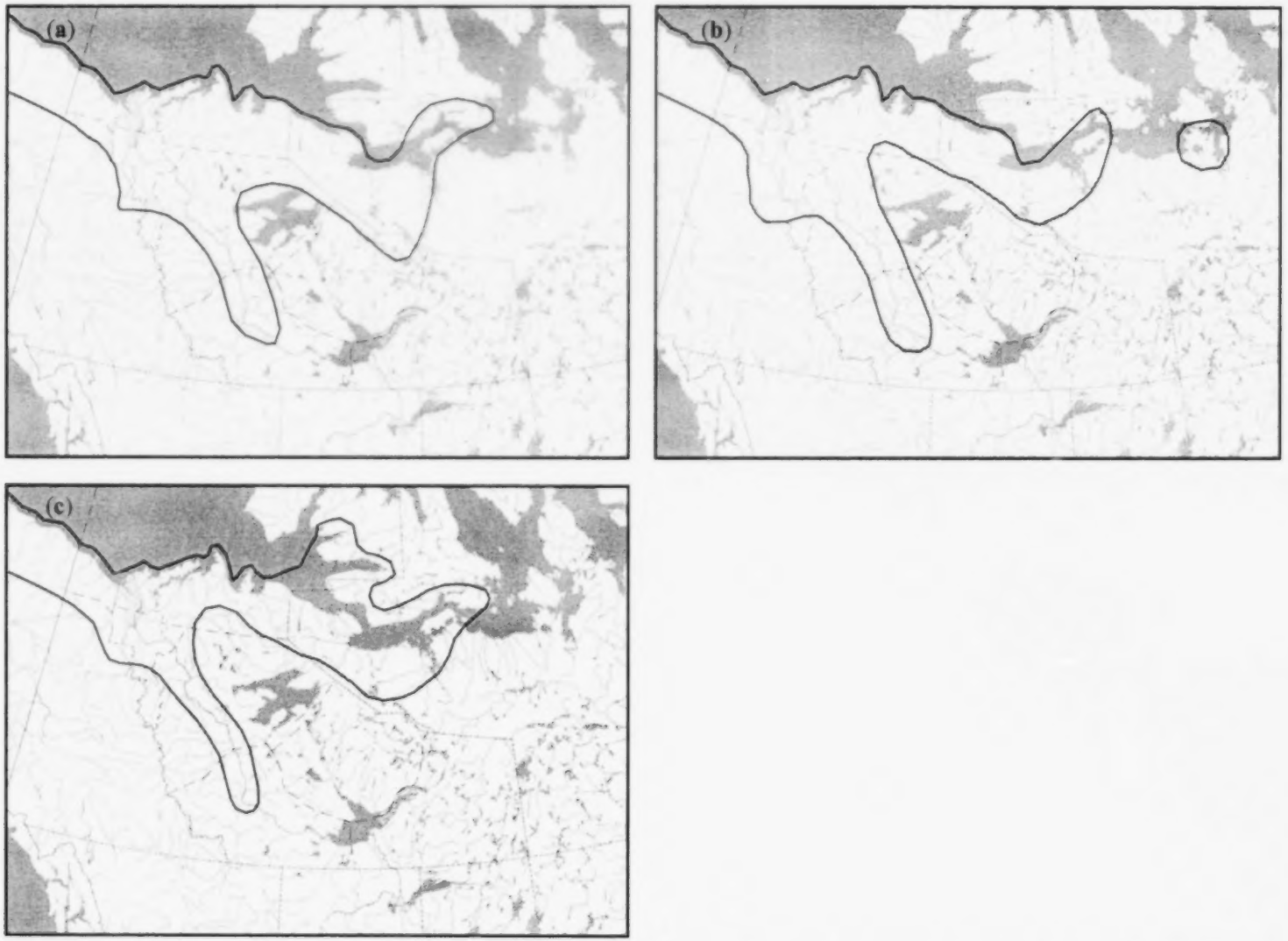

Figure 43. Previously published distributions of Arctic Cisco (*Coregonus autumnalis*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

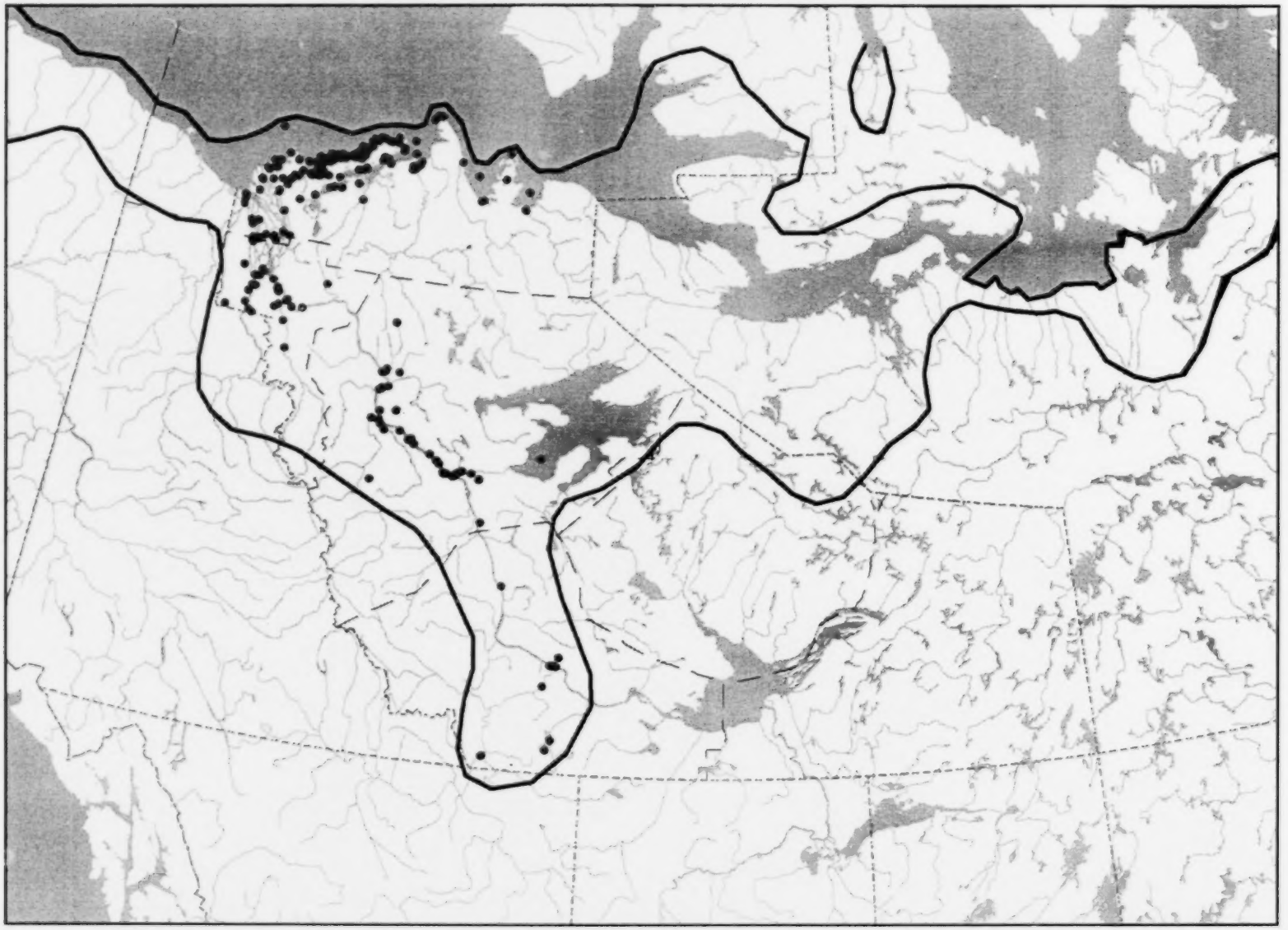

Figure 44. Revised distribution boundaries for Arctic Cisco (*Coregonus autumnalis*) based on point distributions and previously published boundaries.

Coregonus clupeaformis (Mitchill 1818) [Figs. 45, 46]
Coregonus nelsonii Bean 1184 [Fig. 47]
Coregonus pidschian (Gmelin 1789) [Fig. 48]

Common Names: Lake Whitefish (E), grand corégone (F), pi-kok-tok (In, Mackenzie Delta), jikuktok (In, Tuktoyaktuk), kavislik (In, Back River) (McAllister et al. 1987), pikuktuq (Inv), qalupiaq (Inv) (The Community of Aklavik et al. 2000), kapihilik (Inv) (D. McGowan pers. comm. 2006), dalts'an (GW) (VanGerwen-Toyne 2002), åu (NS) (Bayha and Snortland 2004), łıh (DR) (Dogrib Divisional Board of Education 1996), crooked back (E, local name) (The Community of Aklavik et al. 2000; VanGerwen-Toyne 2002; Bayha and Snortland 2004), humpback (E, local name) (Bayha and Snortland 2004), whitefish (E, local name) (Dogrib Divisional Board of Education 1996); **Alaska Whitefish** (E); **Humpback Whitefish** (E), kikiviaktok (In, Thelon and Back rivers) (McAllister et al. 1987).

Conservation Status: Lake Whitefish - Regional: Secure (Working Group on General Status of NWT Species 2006); **Alaska Whitefish** – Not assessed; **Humpback Whitefish** – Regional: Undetermined (Working Group on General Status of NWT Species 2006), Secure (Canadian Endangered Species Conservation Council 2000), National: Undetermined (Canadian Endangered Species Conservation Council 2000).

Habitat: The **Lake Whitefish** is widely distributed in the NT and exhibits lacustrine, adfluvial, and anadromous life history types (Richardson et al. 2001; Evans et al. 2002). The existence of riverine populations has not been confirmed (Evans et al. 2002).

In the Mackenzie River and its tributaries, anadromous Lake Whitefish spawn in late September and early October over substrates of stone or hard silt. Fertilized eggs lodge in crevices of the substrate and hatch in late winter or early spring. Fry are carried downstream with the spring runoff and reach the Mackenzie Delta by late May or June. Lakes and channels of the delta, the inner and outer estuary, coastal areas, and back eddies of the Mackenzie River are used as nursery areas. Juveniles migrate to fresh water drainages of the Tuktoyaktuk Peninsula where they feed and overwinter. They either remain in this area for a few years or migrate back to the delta. After the age of four they may wander along the coast, away from the delta. Post spawning adults migrate downstream in late fall to overwinter in the Mackenzie Delta, the fresh water inner estuary, lakes of Tuktoyaktuk Peninsula or Richardson Island, Tuktoyaktuk Harbour, or Kugmallit Bay (Richardson et al. 2001; Evans et al. 2002). Lake Whitefish have a lower salinity tolerance than most other coregonines and rarely venture further than nearshore areas (Reist and Bond 1988).

Freshwater-resident populations spawn in rivers or lakes over substrates of boulders, gravel, and rubble (Richardson et al. 2001; Evans et al. 2002). In rivers, spawning occurs in shallow, running water, or rapids (Evans et al. 2002) and in lakes at depths <5 m (Richardson et al. 2001). Fertilized eggs settle into crevices of the substrate and hatch between March and May (Richardson et al. 2001). Fry hatched in rivers move into lakes to develop, remaining there until they reach maturity and migrate back to the river to spawn. Once river spawning is completed, adults return to lakes to feed and overwinter (Evans et al. 2002). In lakes, young are typically found at the surface in water <1 m deep in

association with emergent vegetation and woody debris over substrates of boulder, cobble, and sand. They remain near the spawning grounds, moving to deeper water (3—15 m) later in the summer. Juveniles are found over the same substrates as young Lake Whitefish and also associate with woody debris and emergent vegetation. After spawning, adults move to deeper water (>10 m) to overwinter. They do not appear to have a substrate preference and have been found over boulder, gravel, cobble, sand, and clay. They are primarily bottom dwelling, but may also be found in the pelagic zone. Adults may make diel migrations to shallow water at night, possibly to feed (Richardson et al. 2001).

Found in the Mackenzie Delta, the **Alaska Whitefish** primarily inhabits streams and rivers, rarely occurring in lakes. Morrow (1980 cited in Mecklenburg et al. 2002) reported that this species does not tolerate salt water. It was later found that a population in the Yukon River may be anadromous (Alt 2000 cited in Mecklenburg et al. 2002). Many authors do not consider this to be a distinct species, and as such detailed habitat information is lacking and/or confused with that for other members of this complex.

Distributed in coastal areas of the NT, and in the Mackenzie River system from the NT/AB border north to the vicinity of Great Bear River, the **Humpback Whitefish** is primarily an anadromous species. Lacustrine populations occur in large, deep Alaskan lakes. In Alaska, spawning takes place in late September and October in the upper reaches of rivers over a gravel substrate. After spawning, adults return to coastal areas. They re-enter fresh water soon after ice out (Alt 1979).

Taxonomic Comments: These three 'species' are distinguished from each other by gill raker counts (McPhail and Lindsey 1970). Based on modal gill raker counts, McPhail and Lindsey (1970) note that whitefish samples from Bristol Bay drainage, Kuskokwim River, and Alaskan coastal drainages from Bering Strait north, and from Dezadeash Lake, Alsek River system likely represent *C. pidschian* (low modal counts). Almost all remaining North American whitefish samples have high modal counts and likely represent *C. clupeaformis*. Intermediate modal counts occur throughout most of the Yukon River, in Paxson Lake, Copper River system, and occasionally in coastal areas of northern Alaska, the Mackenzie Delta, and the Anderson River. If this intermediate form represents a distinct species, it should be called *C. nelsonii* (McPhail and Lindsey 1970).

Recently, morphological and genetic comparisons have identified five whitefish groups of these three nominate forms, namely, Mississippian Lake Whitefish (distributed across Canada), Alaskan Whitefish, Beringian Lake Whitefish, Nahannian Lake Whitefish (distributed primarily in central Alaska), and Humpback Whitefish (distributed primarily along the northern and western coasts of Alaska) (McDermid et al. 2007). Beringian Lake Whitefish were found to be sufficiently different from Mississippian Lake Whitefish, thus it was recommended that they be classified as part of Alaskan Whitefish. A zone of intermixing between Mississippian Lake Whitefish and Humpback Whitefish was found to occur in the lower Mackenzie River. These three forms were found to be insufficiently different genetically to be considered distinct species, thus it was proposed that they be recognized as different subspecies within the *C. clupeaformis* complex, specifically *Coregonus clupeaformis clupeaformis* (Mississippian Lake Whitefish), *Coregonus clupeaformis nelsonii* (Alaskan Whitefish + Bering form Lake Whitefish + Nahannian form Lake Whitefish), and *Coregonus clupeaformis pidschian* (Humpback Whitefish) (McDermid et al. 2007).

If a specimen was identified in the literature as *C. clupeaformis* (Humpback Whitefish) the common name was changed to Lake Whitefish. If a specimen was identified as *C. pidschian* (Lake Whitefish) the common name was changed to Humpback Whitefish. These changes were made in order to maintain consistency within this report.

Distribution Comments: Lake Whitefish is a southern taxon that has progressively re-colonized the north from the Mississippian refugium, whereas northern refugial populations of Alaska Whitefish, Humpback Whitefish, and possibly Beringian Lake Whitefish have repopulated the NT from the west and through coastal routes. Recent morphological and genetic comparisons suggest the three nominate taxa are best considered as distinct subspecies within the nominate species as noted above (McDermid et al. 2007). To more fully understand the detailed distribution of these forms, representative samples should be collected and deposited with an appropriate archival collection, and gill raker counts should be obtained and included with biological data. The distribution on Victoria Island and northeastern mainland NU was modified based on Stewart and Bernier (1983) and the distribution on Banks Island was modified based on Sutherland and Golke (1978).

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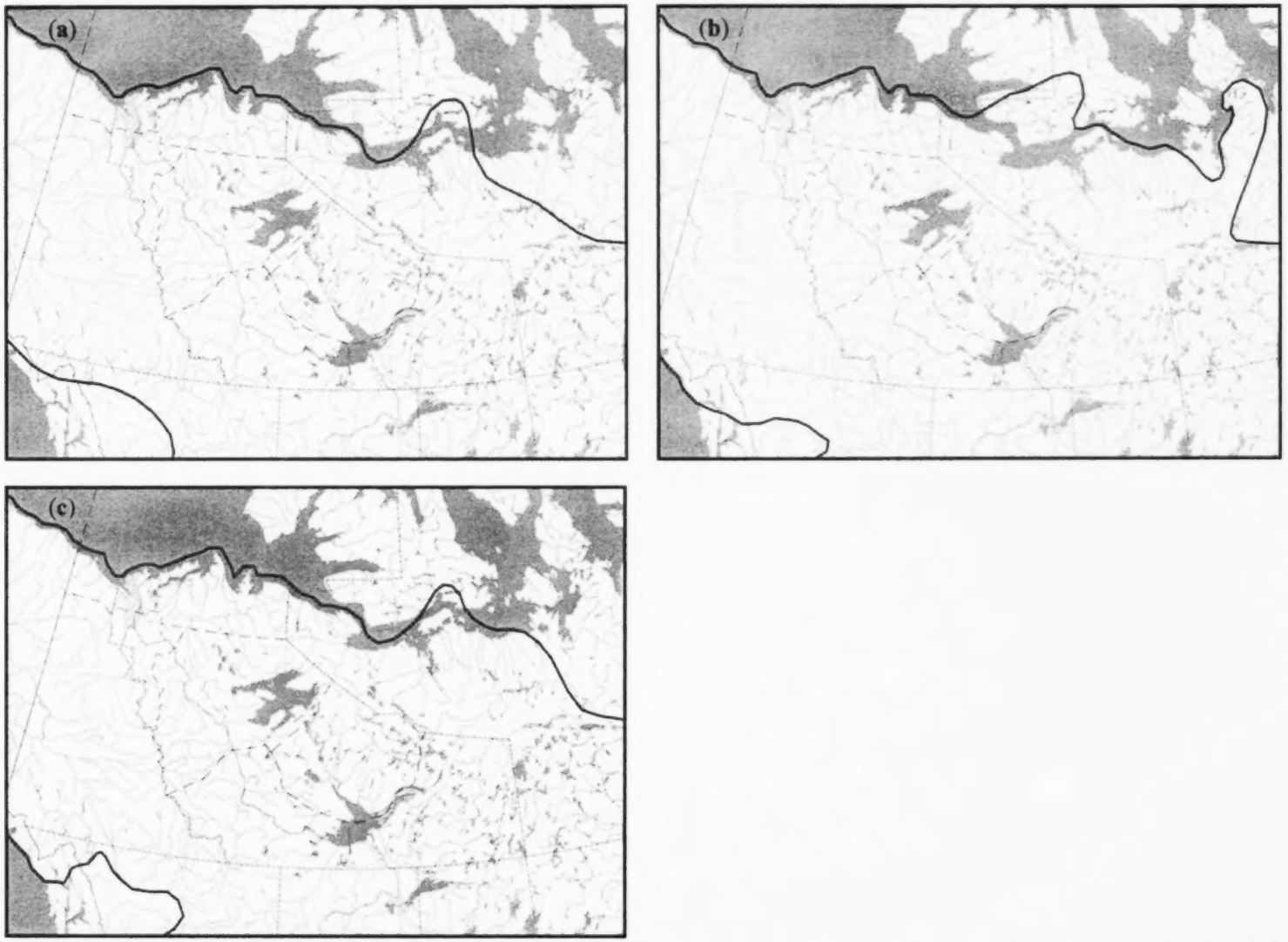

Figure 45. Previously published distributions of Lake Whitefish (*Coregonus clupeaformis*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

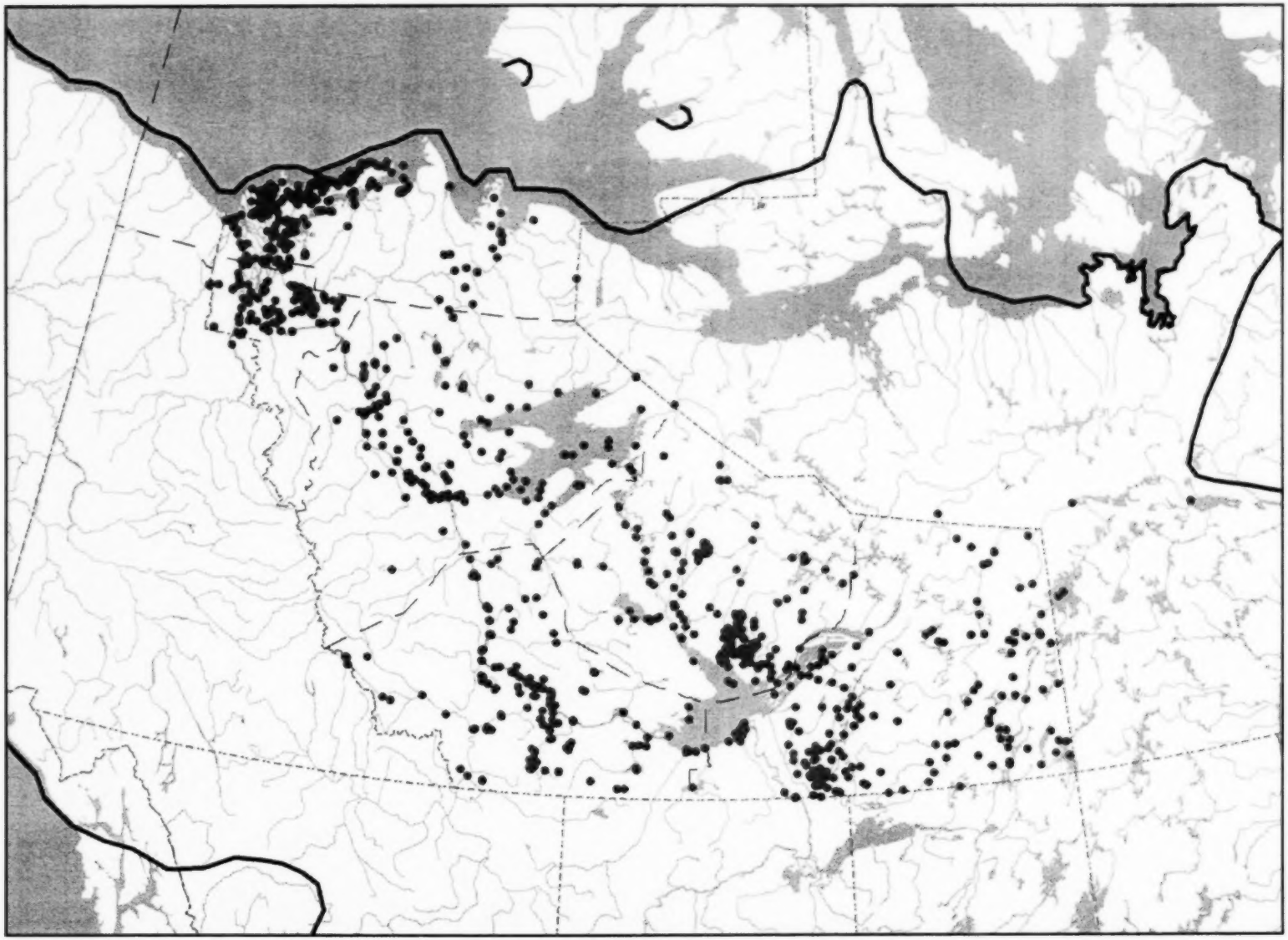

Figure 46. Revised distribution boundaries for Lake Whitefish (*Coregonus clupeaformis*) based on point distributions and previously published boundaries.

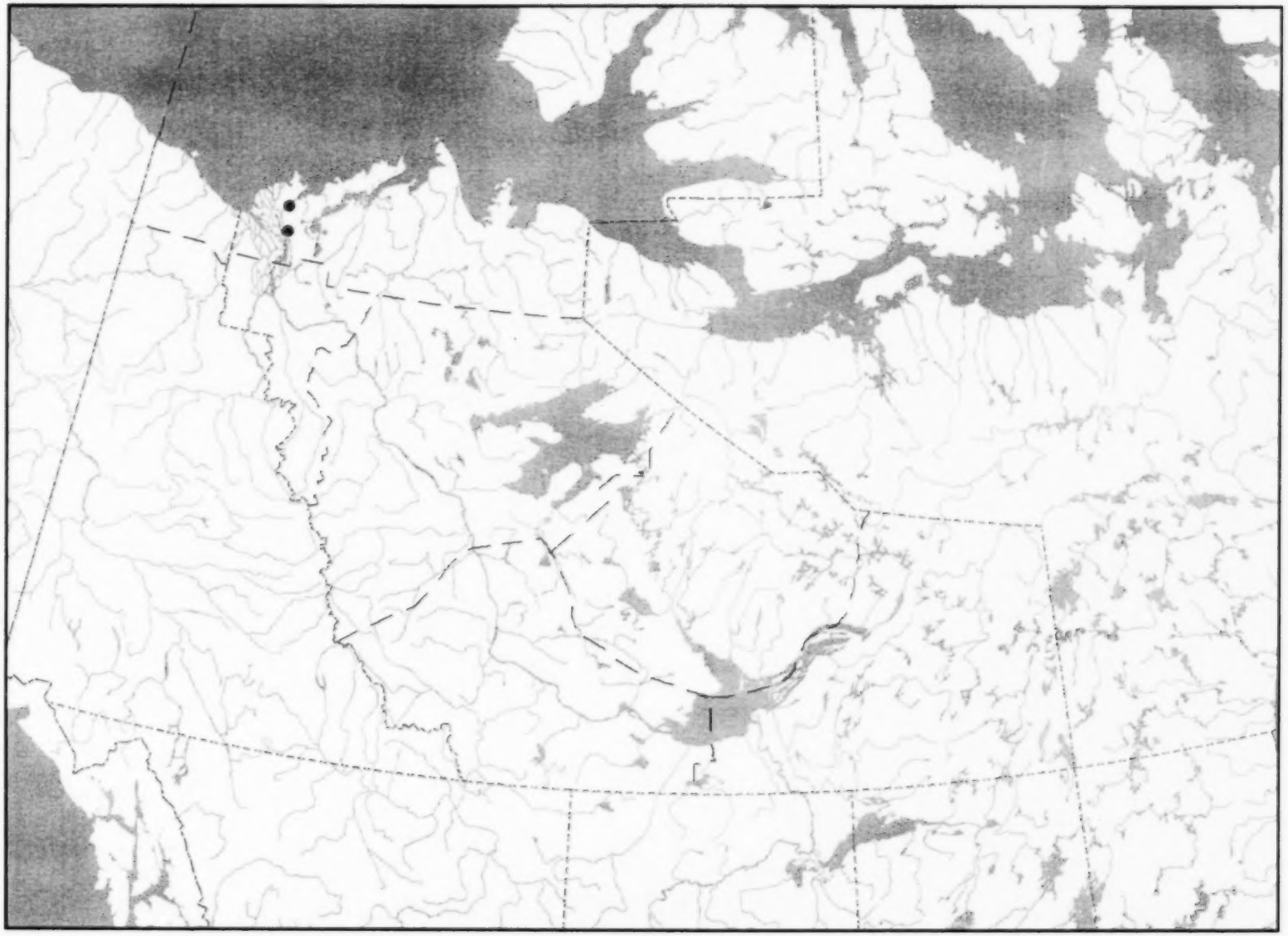

Figure 47. Occurrences of Alaska Whitefish (*Coregonus nelsonii*) based on point distributions.

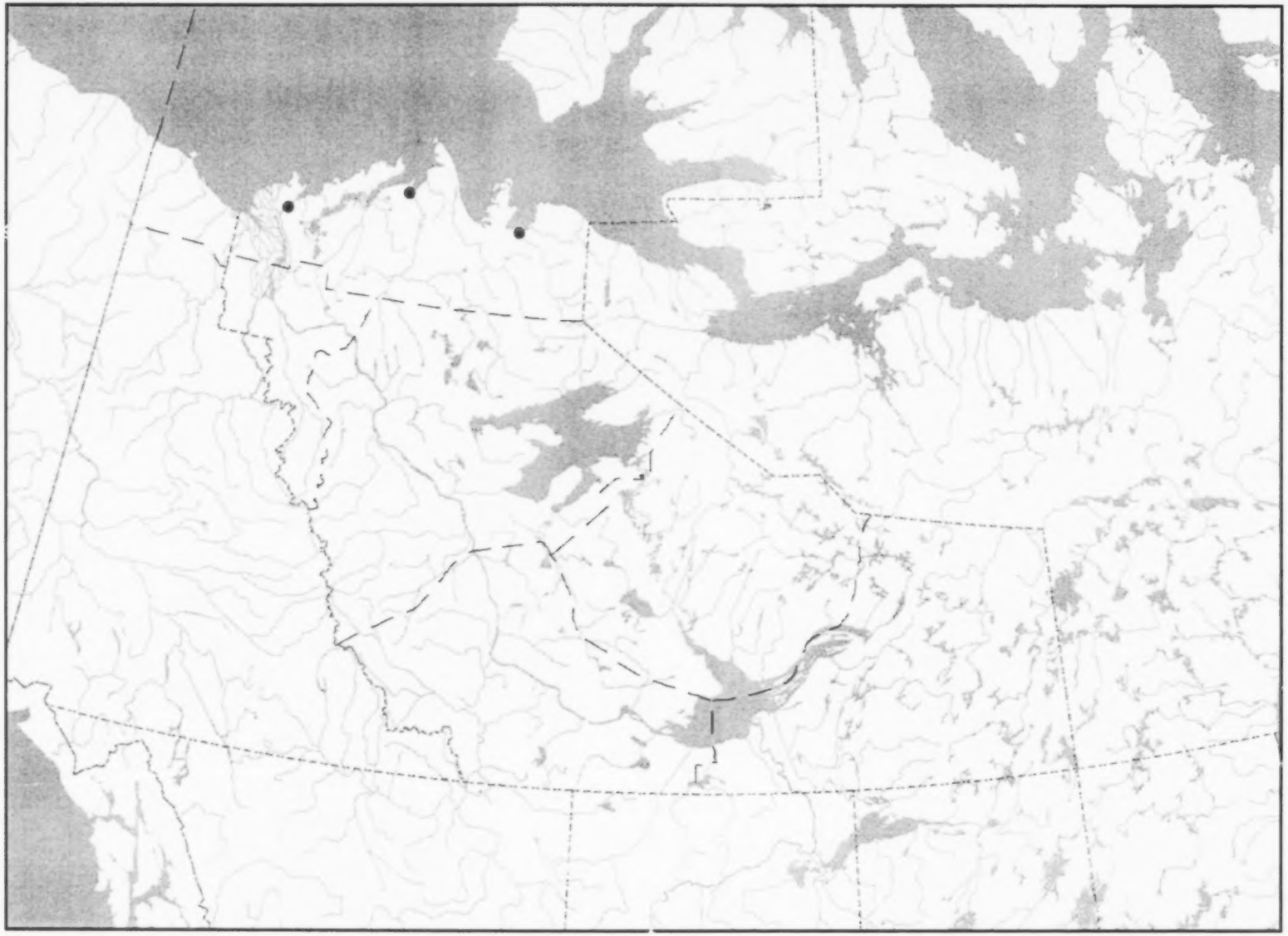

Figure 48. Occurrences of Humpback Whitefish (*Coregonus pidschian*) based on point distributions .

Coregonus nasus (Pallas 1776) [Figs. 49, 50]

Common Names: Broad Whitefish (E), corégone tschir (F) (Coad 2006), anaklek (In, Tuktoyaktuk), an-ark-hlirk (In, Mackenzie Delta) (McAllister et al. 1987), anaakig (Inv) (The Community of Aklavik et al. 2000), anaqklik (Inv), angnaklin (Inv) (D. McGowan pers. comm. 2006), łuk zheii (GW) (Gwich'in Renewable Resource Board 1997; VanGerwen-Toyne 2002), łuk digaii (GW) (VanGerwen-Toyne 2002), åúé wá (NS) (Bayha and Snortland 2004), whitefish (E, local name) (VanGerwen-Toyne 2002).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: The Broad Whitefish is distributed throughout the coastal regions of the NT and within the Mackenzie River system south to Fort Simpson. It is primarily anadromous but also exhibits a lacustrine life history type. A riverine life history type may also exist in the NT (Richardson et al. 2001; Evans et al. 2002).

Anadromous populations spawn in November under the ice over gravel substrates (Evans et al. 2002). Eggs hatch in spring and the young are carried downstream into the outer delta or estuary (Richardson et al. 2001). Once the coastal streams and rivers have become ice free (late June and July), YOY migrate upstream to feeding and nursery areas. They overwinter in channel-connected lakes of the inner delta, coastal lakes of the outer delta, and lake and creek systems of Tuktoyaktuk Peninsula. Juveniles overwinter in coastal lakes (>3 m deep) and streams, and remain for 1—4 years before migrating back to the coast. Juveniles between 4—6 years of age migrate seasonally from overwintering sites in the Mackenzie Delta to feeding grounds in coastal regions (Evans et al. 2002).

In lakes, young and juveniles typically occur over sand, cobble, silt, and gravel substrates. After spawning, adults migrate downstream to deeper areas of rivers, inner estuaries, or coastal areas to overwinter. The majority of their time is spent in brackish estuarine feeding areas along the coast (Evans et al. 2002). Freshwater lacustrine Broad Whitefish occur in large lake systems on the east side of the Mackenzie River, in upstream areas of the Peel and Arctic Red rivers, and possibly in the Outer Delta (Reist and Chang-Kue 1997).

Taxonomic Comments: Early literature (*i.e.*, previous to ~1962) may confuse identities of Broad Whitefish with Lake Whitefish taxa.

Distribution Comments: Broad Whitefish are widely distributed throughout northern and central Alaska (Mecklenberg et al. 2002), the YT, and in the western Kitikmeot area of NU (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area for Broad Whitefish was extended east to include Great Bear Lake and Great Bear River (Scofield et al. 1899; Chang-Kue 1974).

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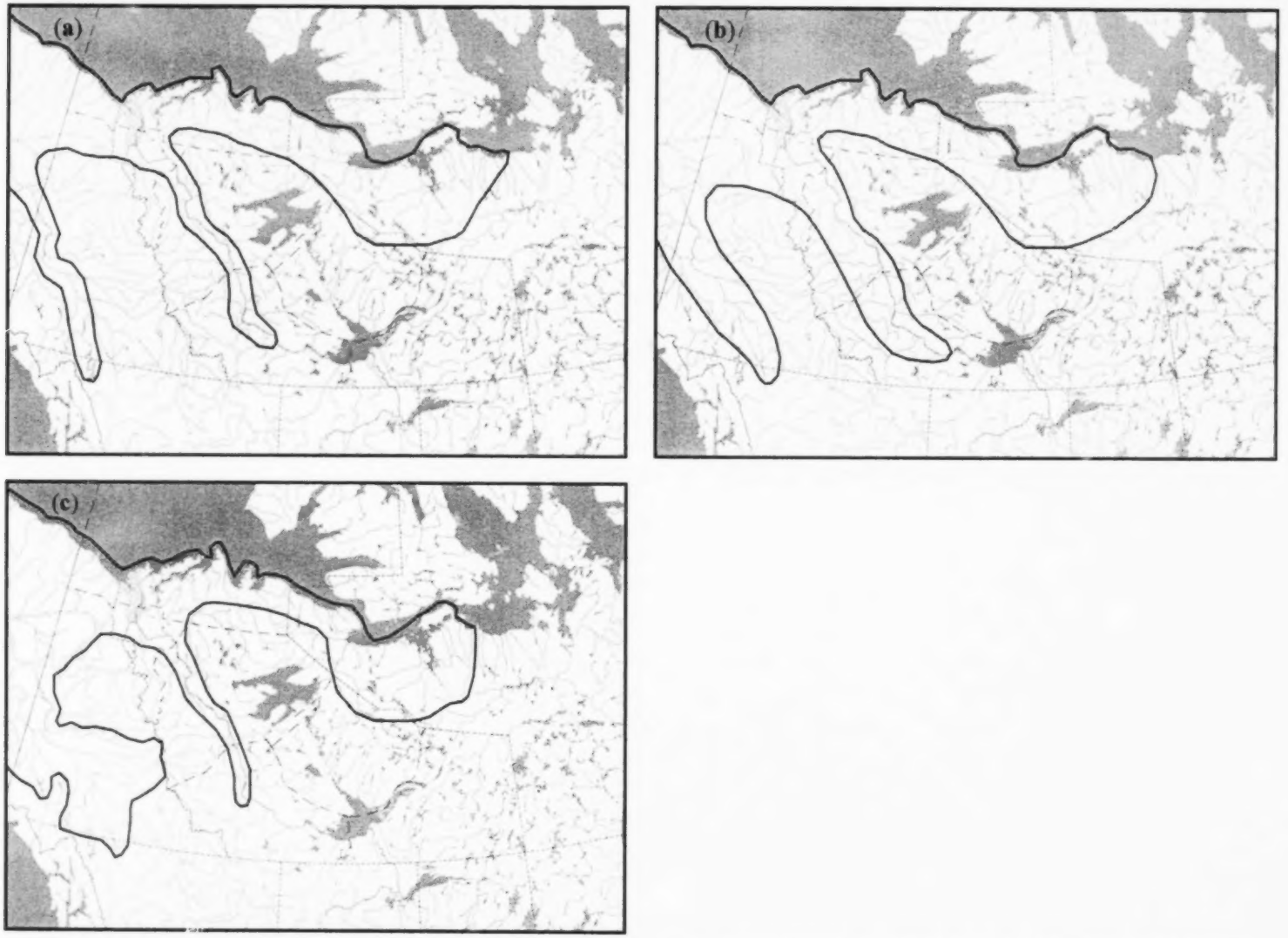

Figure 49. Previously published distributions of Broad Whitefish (*Coregonus nasus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

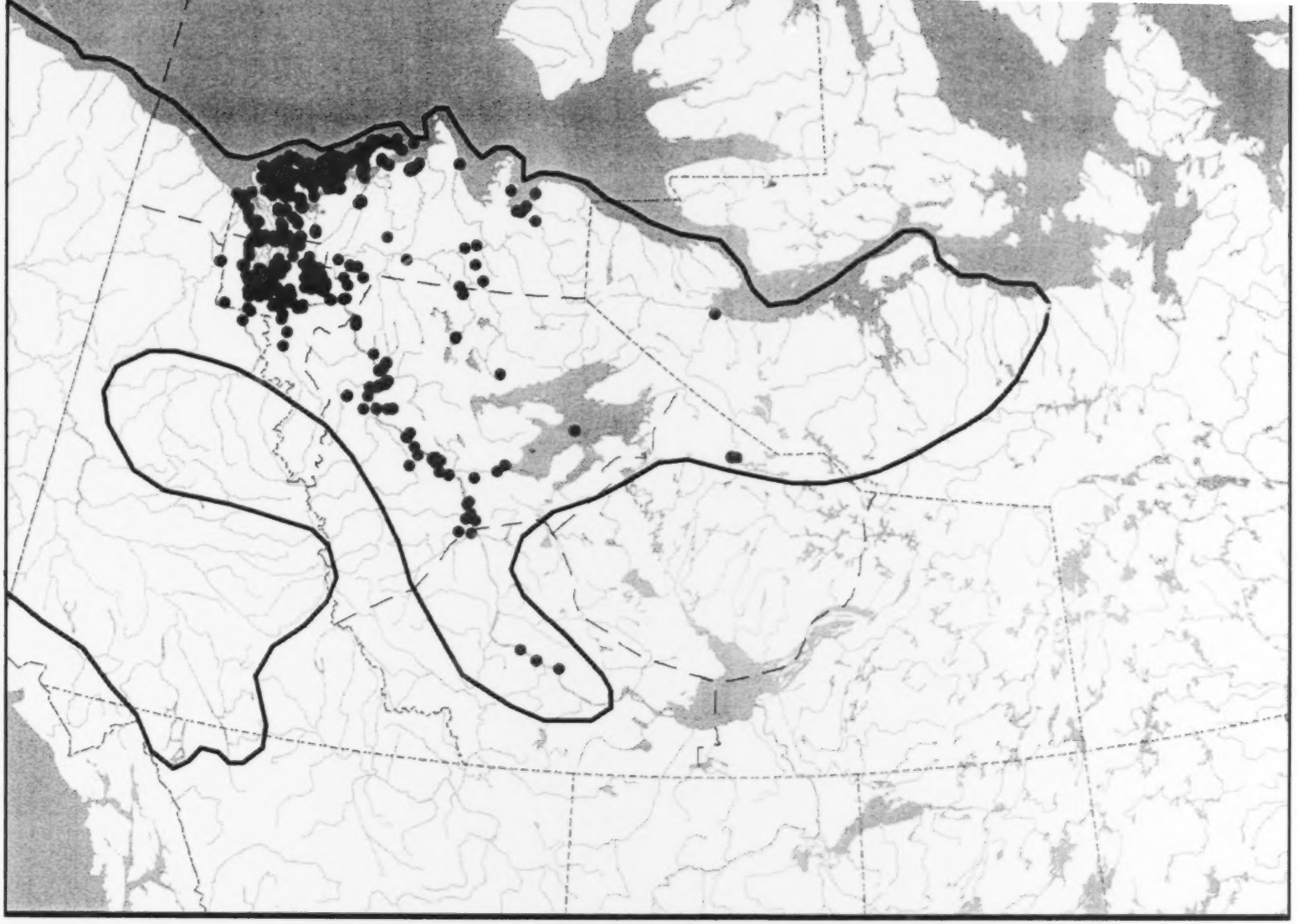

Figure 50. Revised distribution boundaries for Broad Whitefish (*Coregonus nasus*) based on point distributions and previously published boundaries.

Coregonus sardinella Valenciennes 1848 [Figs. 51, 52]

Common Names: Least Cisco (E), cisco sardinelle (F) (Coad 2006), kraaktak (In, Tuktoyaktuk) (McAllister et al. 1987), qaluhaq (Inv) (The Community of Aklavik et al. 2000), Armagiak (Inv), Anmaglak (Inv) (D. McGowan pers. comm. 2006), treeluk (GW) (Gwich'in Renewable Resource Board 1997; VanGerwen-Toyne 2002), åuehya (NS), lugeya (NS) (Bayha and Snortland 2004), big-eyed herring (E, local name) (The Community of Aklavik et al. 2000), least herring (E, local name), big eye herring (E, local name) (Gwich'in Renewable Resource Board 1997), herring (E, local name) (VanGerwen-Toyne 2002; Bayha and Snortland 2004), little coney (E, local name) (VanGerwen-Toyne 2002).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: Distributed throughout the Mackenzie River system and coastal areas of the NT, the Least Cisco exhibits anadromous and lacustrine life history types. Anadromous populations spawn in rivers between late September and early October. In the NT, spawning is believed to occur in the Peel and Husky channels, and in the Arctic Red River. Eggs are broadcast over substrates of sand or gravel and hatch in May or June under the ice. Spring runoff carries the young downstream to the outer Mackenzie Delta (Richardson et al. 2001; Evans et al. 2002). They either remain in this area or make coastal summer migrations to Wood Bay, Liverpool Bay, Kugmallit Bay, Anderson River estuary, and other areas near the Tuktoyaktuk Peninsula. Overwintering occurs in these systems and in the Mackenzie Delta. After spawning, adults return to the delta. During the summer, they feed along the coast and may enter higher salinities than juveniles (Evans et al. 2002).

Lacustrine populations spawn in September and October in shallow areas along lake shores, typically over sand and gravel substrates. Hatching occurs between late May and mid-June. Young occupy non-vegetated areas <1.5 m deep, while juveniles are often found in association with vegetation. Adults may use one lake for spawning and another for overwintering, indicating a difference in habitat requirements (Richardson et al. 2001).

Taxonomic Comments: Greater taxonomic complexity than indicated above may exist, with several forms being present in fresh waters. Although identified herein as Least Cisco, the relationship among inland populations and anadromous forms, and all of these with Cisco (*C. artedi*) requires further examination. As noted for Arctic Cisco, local fishers usually do not differentiate among Cisco species, thus the local common names usually refer to the entire group present in the area.

Distribution Comments: The Least Cisco occurs in north and central Alaska (Mecklenburg et al. 2002), northern and Bering Sea drainages of the YT, and in the Kitikmeot (Scott and Crossman 1973; Lee et al. 1980) and Kivalliq areas of NU, although these latter areas require confirmation (Coad et al. unpubl. 2006). The NT distribution area for Least Cisco was extended to include Great Slave Lake, Slave River, Hay River (Moshenko and Low 1978; Little et al. 1998), Hanbury River, and Hill Island Lake (Canadian Museum of Nature 2005). The distribution around the Arctic islands was

modified based on Sutherland and Golke (1978) and Stewart and Bernier (1982, 1983, 1984).

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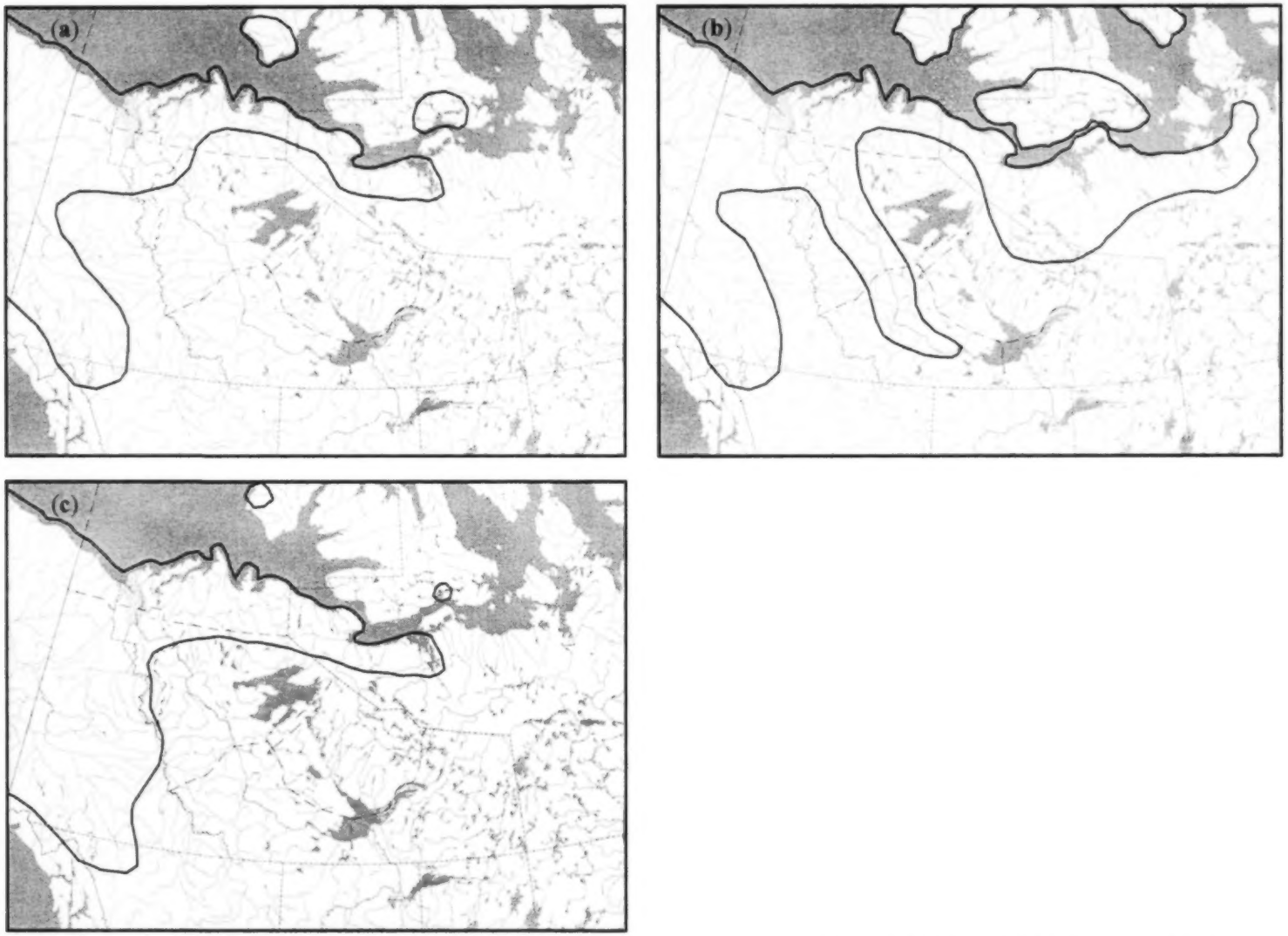

Figure 51. Previously published distributions of Least Cisco (*Coregonus sardinella*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

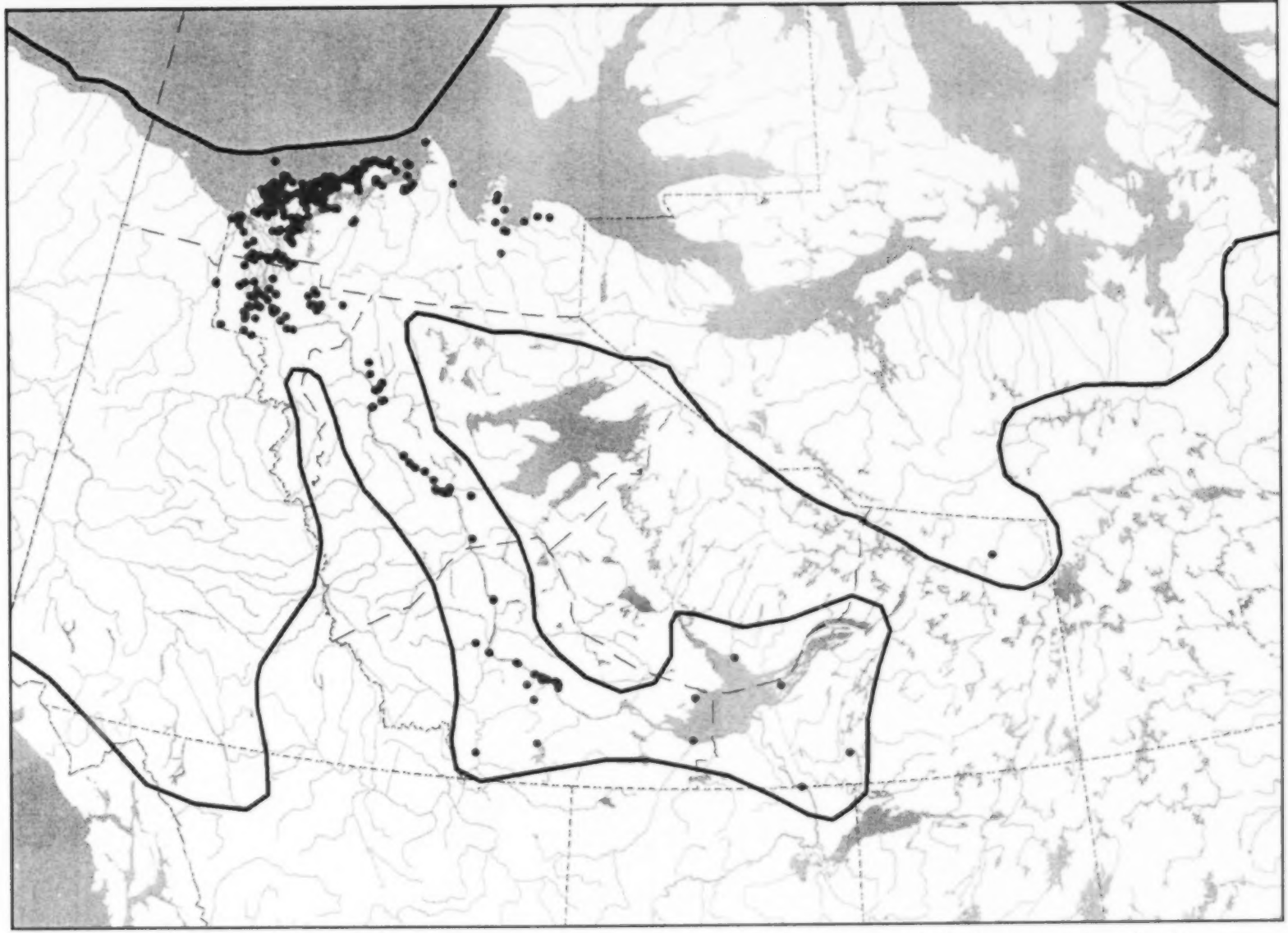

Figure 52. Revised distribution boundaries for Least Cisco (*Coregonus sardinella*) based on point distributions and previously published boundaries.

Coregonus zenithicus (Jordan & Evermann 1909) [Figs. 53, 54]

Common Names: Shortjaw Cisco (E), cisco à mâchoires égales (F) (Coad 2006).

Conservation Status: Regional: At risk (Working Group on General Status of NWT Species 2006), Threatened (Assessed: 2003) (COSEWIC 2006).

Habitat: The known northern limit confirmed for the Shortjaw Cisco's distribution is reached in Great Slave Lake. This species exhibits a lacustrine life history type and is found in cool, deep waters of larger and usually ecologically complex lakes. Spawning typically occurs in the fall, but may also take place in spring or early summer depending on the population. Spawning occurs over a wide range of depths (9—73 m) over substrates of clay and sand. Larvae are pelagic and do not appear to have a depth preference. Adults generally occur below the thermocline at depths between 55—144 m (Richardson et al. 2001).

Taxonomic Comments: It has been proposed that all Ciscoes in central Canada and northern United States be recognized as *C. artedi* (Turgeon and Bernatchez 2003 cited in Nelson et al. 2004). Nelson et al. (2004) recognize that this may be valid, but prefer to wait for additional detailed taxonomic studies. Distinguishing features often overlap with Cisco (*C. artedi*) and studies of their DNA have not revealed significant differences (Reed et al. 1998; Turgeon et al. 1999; Steinhilber et al. 2002 cited in Murray and Reist 2003). Thus, the validity of this species requires further examination (Murray and Reist 2003).

Distribution Comments: The Shortjaw Cisco is not found in Alaska, the YT, or NU. The NT distribution area was extended east to include the Tazin River (Harper and Nichols 1919) however, this riverine occurrence is unsound from the perspective of the species' biology and habitat preferences (see above). Early identifications such as this appear to represent mis-identifications based upon the uncertain and incomplete taxonomy of the day. Accordingly, although shown on the map, we consider this point as most likely representing a variant form of Cisco (*C. artedi*). Examination of museum specimen(s) if available and re-sampling of this area are both required. The distribution area extending north along the Mackenzie River to Great Bear Lake (Todd 2003) is considered uncertain as the specimen can not be verified.

Notes

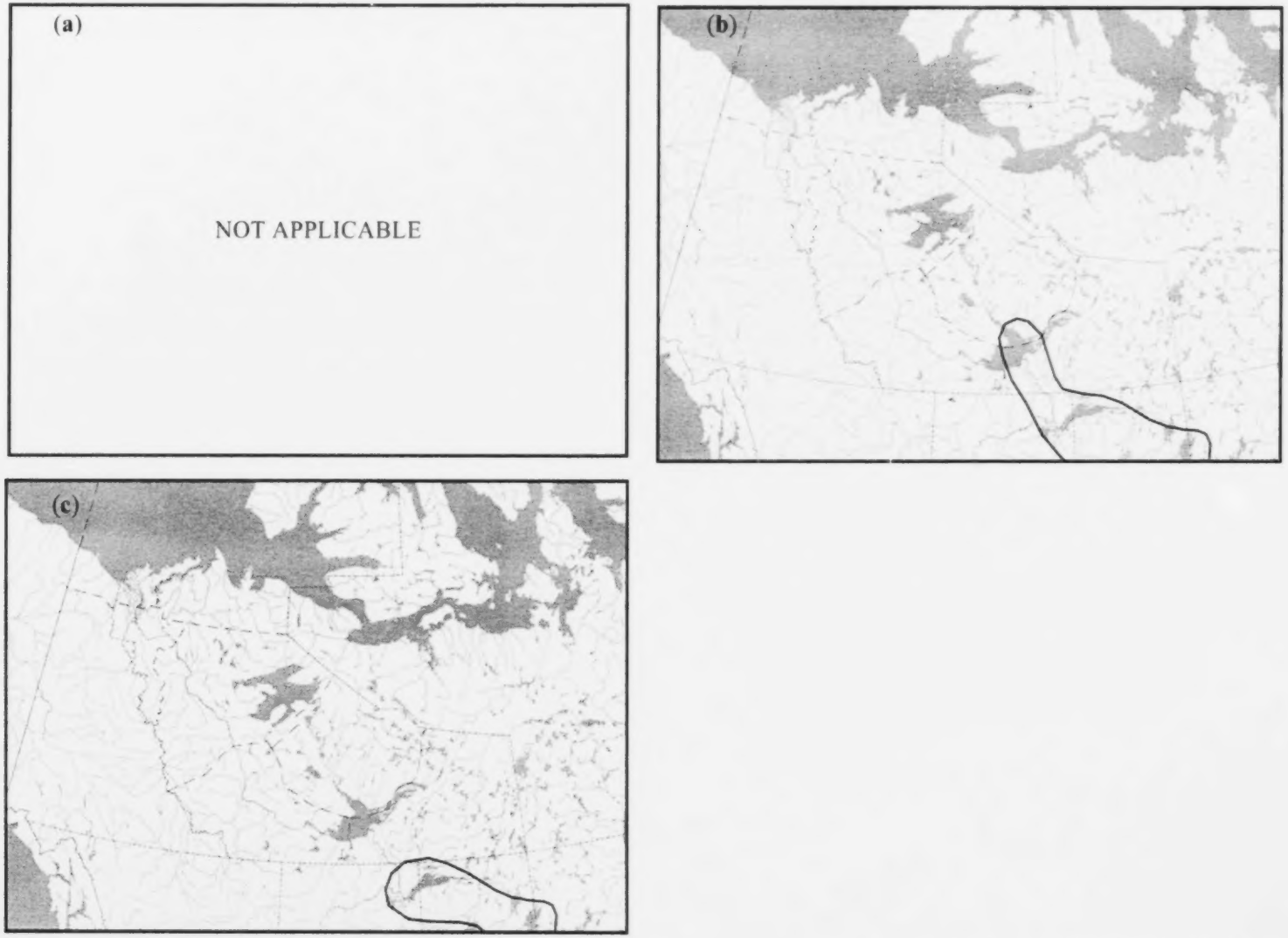

Figure 53. Previously published distributions of Shortjaw Cisco (*Coregonus zenithicus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

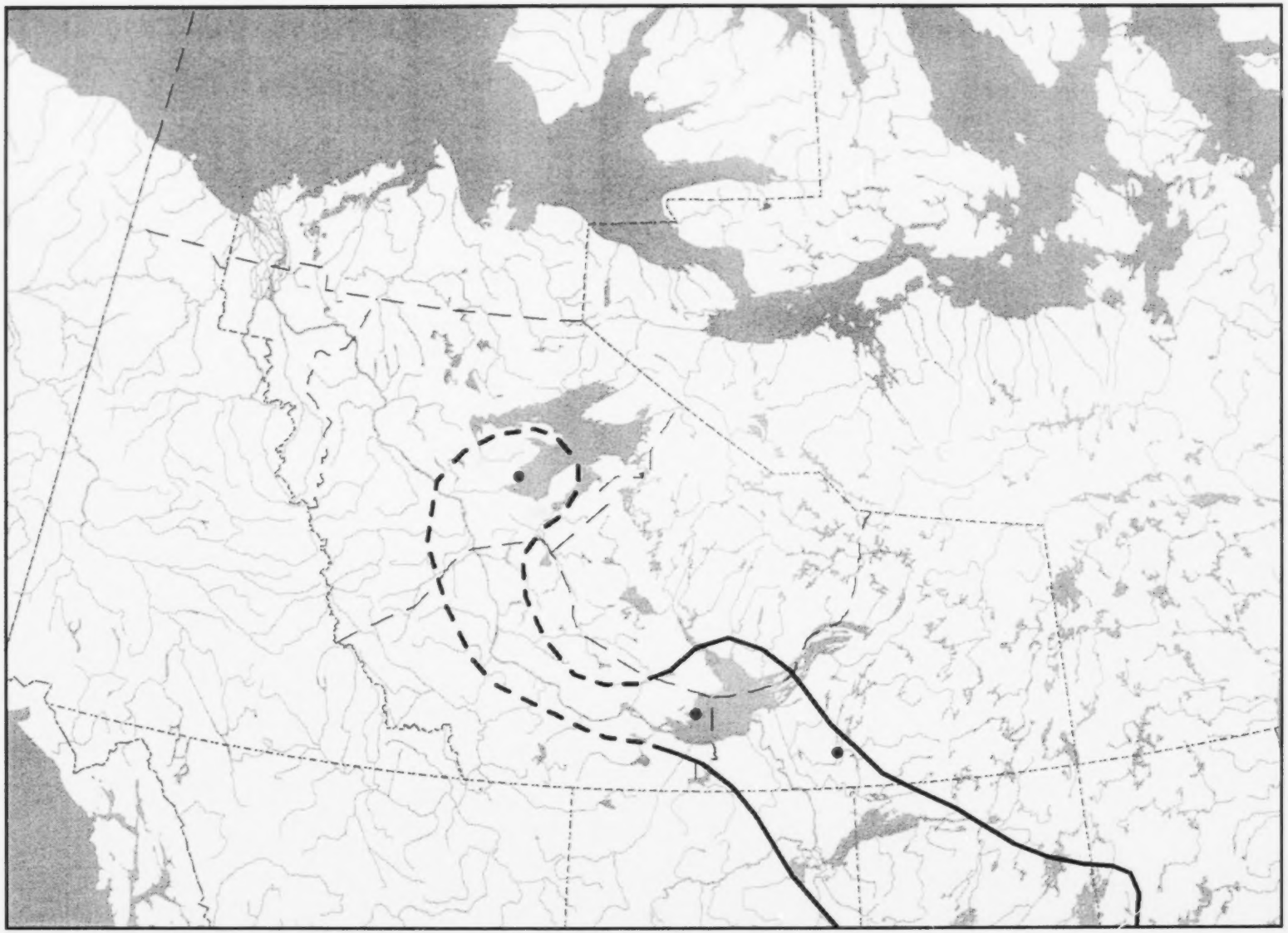

Figure 54. Revised distribution boundaries for Shortjaw Cisco (*Coregonus zenithicus*) based on point distributions and previously published boundaries.

Oncorhynchus gorbuscha (Walbaum 1792) [Figs. 55, 56]

Common Names: Pink Salmon (E), saumon rose (F) (Coad 2006).

Conservation Status: Regional: Vagrant (usual range not in the NT) (Working Group on General Status of NWT Species 2006).

Habitat: Distributed in the Mackenzie Delta area, the Pink Salmon exhibits an anadromous life history type. Spawning occurs in rivers between August and September over a gravel substrate and is not known to occur in the NT. The female digs a redd in a riffle area into which eggs are deposited and fertilized. The redd is then covered by the female. Both adults die after spawning. Depths used for spawning can range from 0.3—1 m, but are most frequently between 0.2—0.25 m at water velocities ranging from 0.3—1.4 m/s. Eggs hatch between December and February and the young remain in the gravel until April or May. After emergence from the substrate they move downstream to coastal areas, migrating at night and hiding in the substrate during the day. They spend several months in coastal areas before migrating to sea to feed and mature. After 18 months at sea, adults return to their natal streams (or occasionally a different stream) to spawn (Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: Pink Salmon are found in coastal areas throughout Alaska (Mecklenburg et al. 2002), occur as vagrants along the YT North Slope, and are distributed in southwestern YT Pacific drainages (Scott and Crossman 1973; Lee et al. 1980; Stephenson 2005, 2006). This species has not been recorded from NU waters, with the exception of an old record of a failed introduction in Hudson Bay (Coad and Reist 2004). Point distributions provided are valid to 2005 based upon unpublished information resulting from a salmon monitoring project conducted by Fisheries and Oceans Canada in the western Arctic. It appears that the frequency of occurrence of vagrants may be increasing. Spawning has not been documented for any locations in our area, so colonization of the Mackenzie system by this species has not likely occurred. The NT distribution for Pink Salmon was extended south to include the Rat River and the YT border (Hunter 1974) and north to Banks Island (Stephenson 2005, 2006).

Notes

Figure 55. Previously published distributions of Pink Salmon (*Oncorhynchus gorbuscha*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

Figure 56. Revised distribution boundaries for Pink Salmon (*Oncorhynchus gorbuscha*) based on point distributions and previously published boundaries.

Oncorhynchus keta (Walbaum 1792) [Figs. 57, 58]

Common Names: Chum Salmon (E), saumon kéta (F) (Coad 2006), paiirluq (Inv) (Coad and Reist 2004), shii (GW) (D. McGowan pers. comm. 2006), geo sahba (NS), dog salmon (E, local name) (Bayha and Snortland 2004).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: Chum Salmon are found in the Mackenzie Delta region of the NT east to the Anderson River, the Mackenzie River system, and Great Bear and Great Slave lakes. This anadromous species spends very little time in fresh water (Richardson et al. 2001; Evans et al. 2002). Rivers and lakes are used for spawning migrations, while spawning is restricted to rivers. Spawning occurs from September to October in riffle areas over a gravel substrate. The female constructs a redd over which eggs and sperm are released simultaneously. The eggs are then covered by the female. Both adults die after spawning. They may also spawn over bedrock and boulders, in which case eggs are deposited directly on the substrate. Eggs hatch in spring and the young spend several weeks in the substrate before emerging to migrate downstream. They hide in gravel most of the day and migrate at night. The migration through the Mackenzie Delta system is lengthy so lakes along the route may be used as nursery and feeding areas. Several weeks may be spent feeding in the delta area before migrating to sea. Adults return to their natal streams to spawn 3—4 years later (Richardson et al. 2001).

Taxonomic Comments: None.

Distribution Comments: Chum Salmon are distributed throughout Alaska (Mecklenburg et al. 2002), and occur in Bering Sea drainages, Pacific drainages, and along the North Slope of the YT (Scott and Crossman 1973; Lee et al. 1980; Stephenson 2005, 2006). They have not been recorded from NU waters, with the exception of an old record of a failed introduction in Hudson Bay (Coad and Reist 2004) and a single specimen near Kugluktuk (Stephenson 2005, 2006). The recurrent captures of Chum Salmon in upper areas of the Mackenzie River indicate that some populations are locally well established, but likely of low abundance at this time. The distribution area for Chum Salmon was extended south to include the Slave and Liard rivers (McLeod and O'Neil 1983; Stephenson 2005, 2006), and east to include Darnley Bay, Hornaday River, Franklin Bay (Corkum and McCart 1981; Craig and Haldorson 1986; Stewart et al. 1993), and the Coppermine River area near Kugluktuk (Stephenson 2005, 2006).

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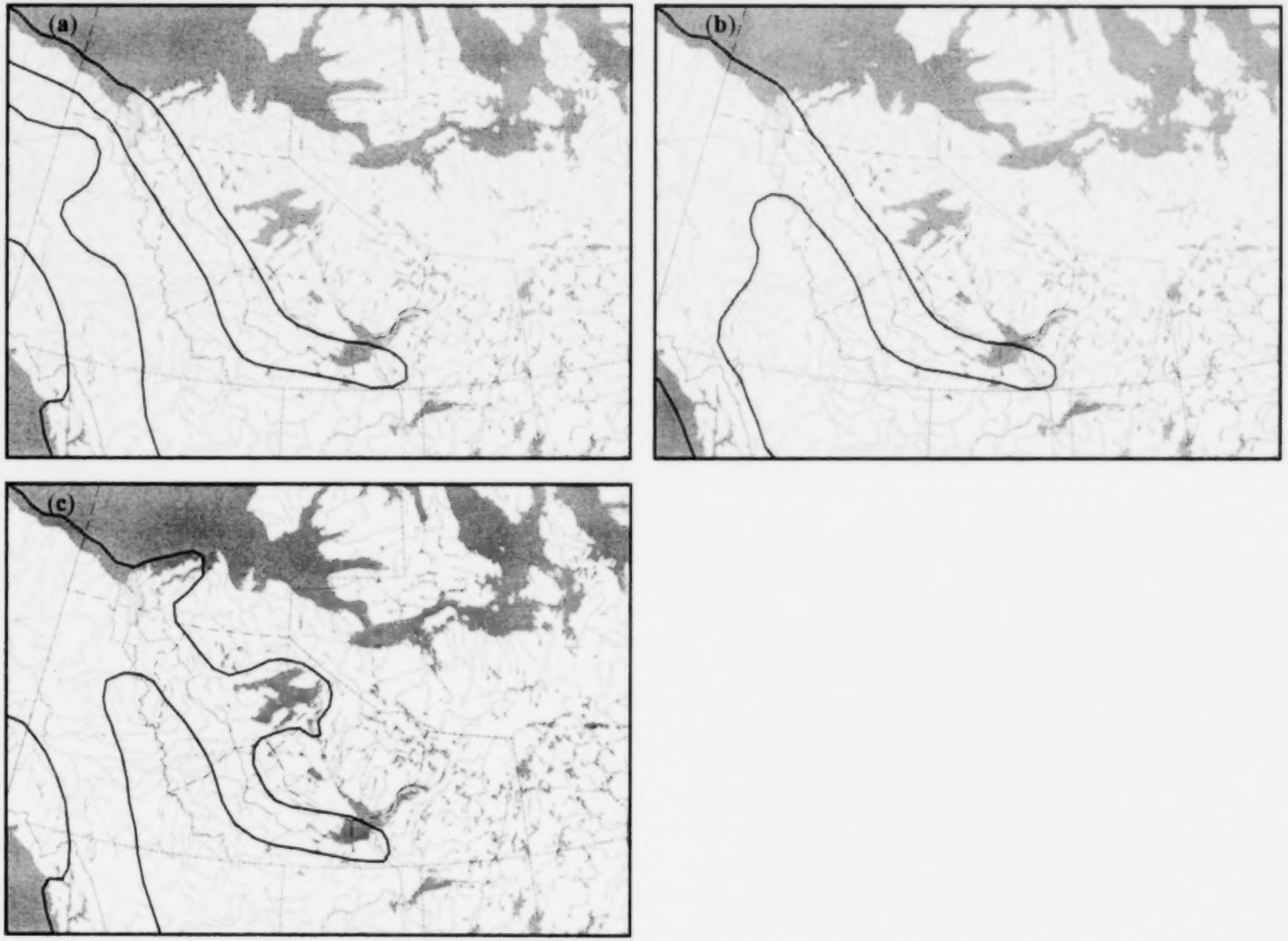

Figure 57. Previously published distributions of Chum Salmon (*Oncorhynchus keta*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

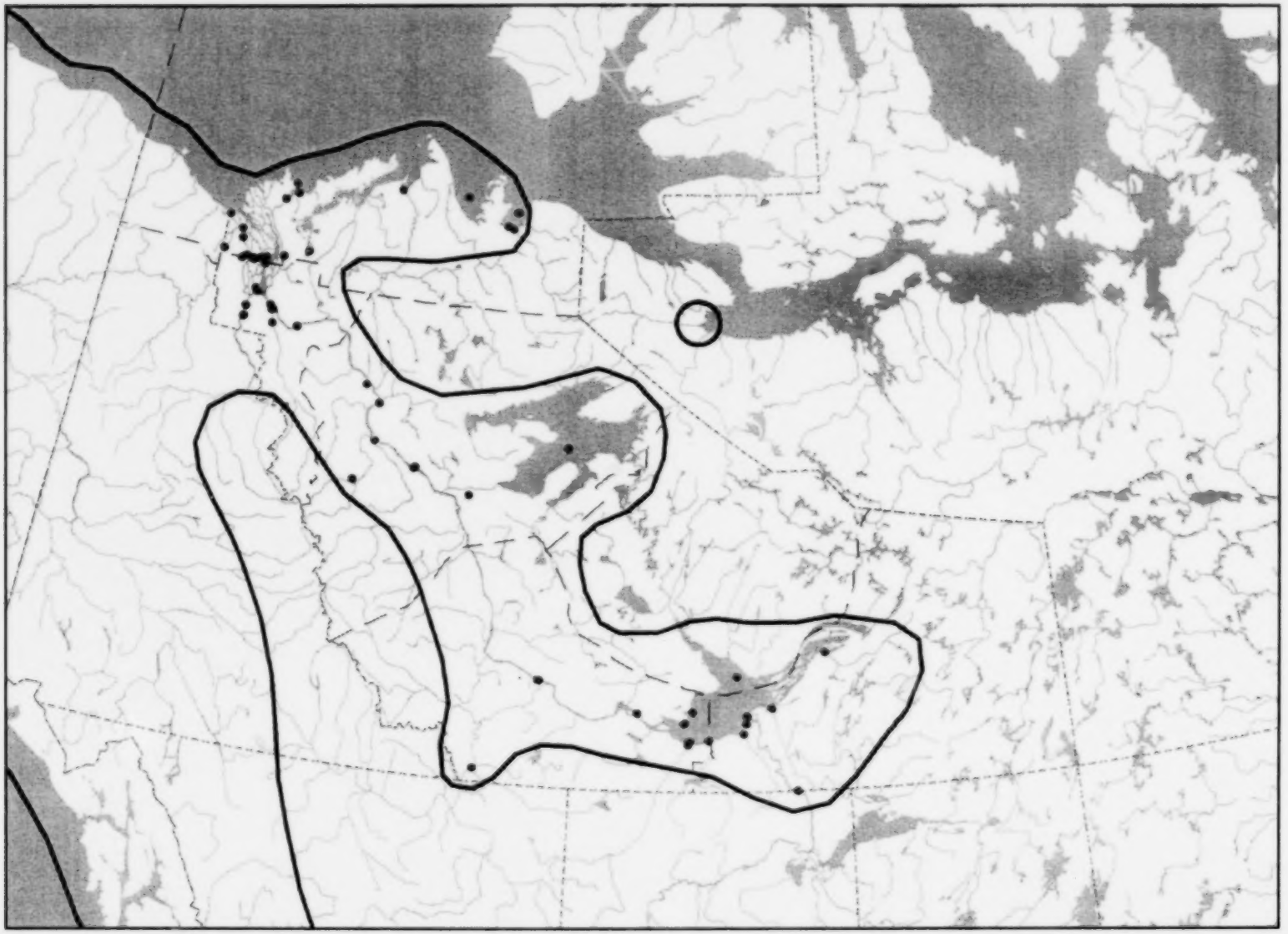

Figure 58. Revised distribution boundaries for Chum Salmon (*Oncorhynchus keta*) based on point distributions and previously published boundaries.

Oncorhynchus kisutch (Walbaum 1792) [Figs. 59, 60]

Common Names: Coho Salmon (E), saumon coho (F), silver salmon (E, local name) (McPhail and Lindsey 1970).

Conservation Status: Regional: Vagrant (usual range not in the NT) (Working Group on General Status of NWT Species 2006).

Habitat: The distribution of Coho Salmon in the NT is uncertain. This species has an anadromous life history type. Spawning occurs in November in small tributary streams of larger rivers. Females construct redds in riffle areas below pools (McPhail and Lindsey 1970). Preferred spawning sites have water velocities between 0.21—0.7 m/s, minimum depths ≥0.15 m, and substrates of gravel and small rubble with low amounts of fine sediment. Ideal spawning temperatures range from 4.4—9.4°C (McMahon 1983). Eggs and sperm are released simultaneously, and the nest is covered by the female. Both adults die after spawning (McPhail and Lindsey 1970). Ideal incubation temperatures range from 4.4—13.3°C, and dissolved oxygen concentrations ≥8 mg/l are needed for high survival and emergence of fry (McMahon 1983).

Eggs hatch in 6—8 weeks, depending on water temperature, and young remain in the gravel for 2—3 weeks. After emergence, they form small schools in shallow areas, stream shores, shallow pools, or in backwaters and eddies (McPhail and Lindsey 1970; McMahon 1983). They remain in schools for a short time, then become territorial and move into pools and slow water areas (McPhail and Lindsey 1970). Fry that are unable to hold territories either move downstream to the ocean or to other areas in the stream system. Those that migrate to sea have a low probability of returning as adults (McMahon 1983).

Fry and juveniles use logs, roots, debris, undercut banks, and overhanging vegetation as cover. As water temperature decreases, they become less active and move to deeper (≥0.45 m), slow (<0.15 m/s) water in areas with an abundance of cover, including roots, logs, and flooded brush, to overwinter (McMahon 1983). In the Yukon, young remain in fresh water for two years before migrating to sea (McPhail and Lindsey 1970). In Alaska, they remain in fresh water for 2—4 years (McMahon 1983). Once they reach the sea, they inhabit inshore areas for the first few months before migrating out to the open waters. They return to fresh water to spawn after two years at sea (McPhail and Lindsey 1970).

Taxonomic Comments: None.

Distribution Comments: Coho Salmon are distributed in Alaska in areas south of Point Hope and strays occur along the North Slope coast (Mecklenburg et al. 2002). They are also found in central Bering Sea drainages of the YT, Pacific drainages of the southwestern YT, and strays occasionally occur along the North Slope of the YT; they are not known from NU (Scott and Crossman 1973). The NT distribution area added for Coho Salmon is considered uncertain and includes the Mackenzie Delta and Great Bear Lake (Babaluk et al. 2000; Stephenson 2005, 2006).

Notes

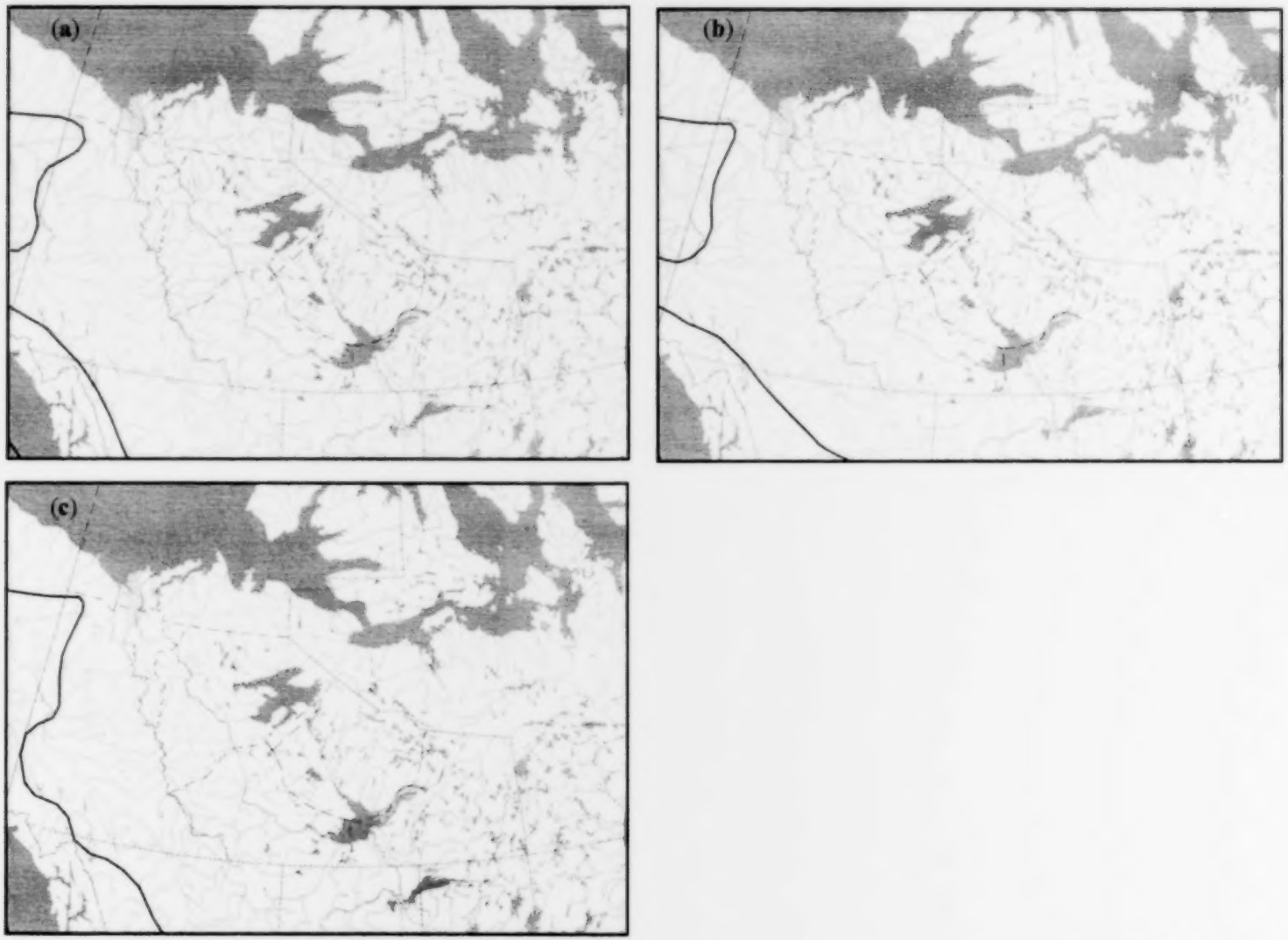

Figure 59. Previously published distributions of Coho Salmon (*Oncorhynchus kisutch*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

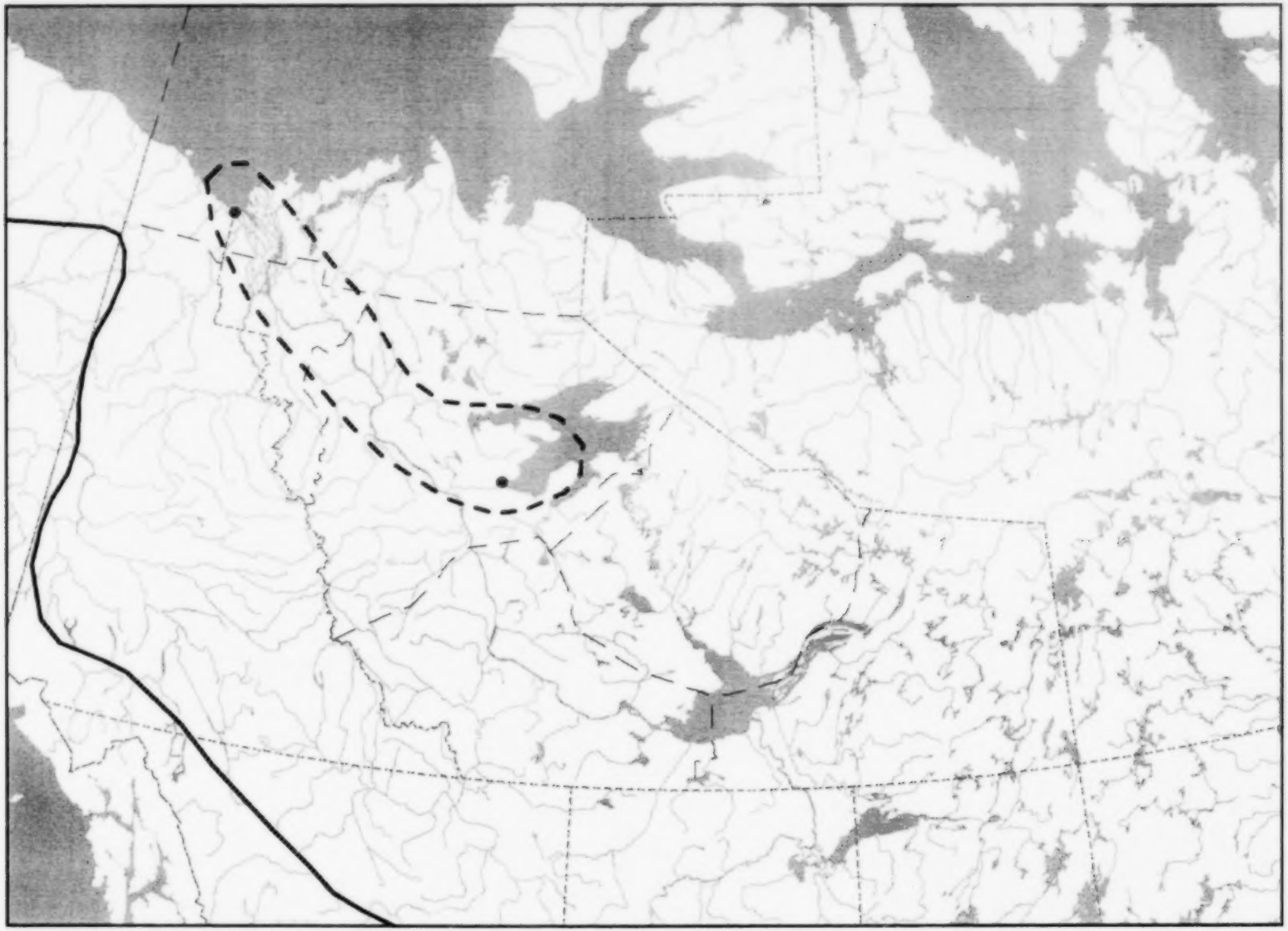

Figure 60. Revised distribution boundaries for Coho Salmon (*Oncorhynchus kisutch*) based on point distributions and previously published boundaries.

Oncorhynchus mykiss (Walbaum 1792) [Figs. 61, 62]

Common Names: Rainbow Trout (E, freshwater-resident), steelhead salmon (E, anadromous), truite arc-en-ciel (F).

Conservation Status: Regional: Alien (Working Group on General Status of NWT Species 2006).

Habitat: First introduced into the NT in Seven Mile Lake in 1959 (Crossman 1991), Rainbow Trout exhibit lacustrine, riverine, and anadromous life history types. All populations spawn in spring in clear, cold-water streams. Water velocity over the spawning grounds used by anadromous populations may range from 0.6—0.8 m/s and depth from 0.2—1.5 m (Roberge et al. 2002). The female constructs a redd in a gravel area at the head of a riffle just below a pool. The eggs are deposited into the redd and fertilized, after which they are covered by the female. Incubation lasts approximately two months depending on water temperature and the young emerge from the gravel in late summer (McPhail and Lindsey 1970).

Generally, lacustrine fry enter the lake during their first summer or fall, however, some spend their first winter in their natal streams and enter the lake the following spring. Riverine young move into riffle areas where they remain for the summer, moving to pools for the winter (McPhail and Lindsey 1970). In the Peace River drainage, freshwater-resident Rainbow Trout were caught in areas characterized by riffles and runs, gravel and larger substrates, and a relatively small amount of total cover consisting of boulders, deep pools, and large woody debris (Roberge et al. 2002).

Anadromous young rear in habitats at the head of riffles over substrates of gravel and rubble and occur at depths up to 1.2 m. They may use woody debris and overhanging vegetation as cover. Juveniles occupy pool and riffle or head of riffle habitats at depths between 0.3—2 m over gravel, rubble, cobble, and boulder substrates. Logs and substrates are used as cover, with substrate use increasing during the winter (Roberge et al. 2002). Anadromous populations spend 1—4 years in fresh water before migrating to the sea. They remain at sea for an additional 1—4 years before returning to spawn (McPhail and Lindsey 1970).

Taxonomic Comments: Nelson et al. (2004) do not recognize steelhead salmon as a valid common name for the anadromous form.

Distribution Comments: Rainbow Trout occur naturally in southern Alaska, and have been stocked in interior Alaskan waters (Mecklenburg et al. 2002). In the YT, they occur in southwestern drainages to the Pacific Ocean (Scott and Crossman 1973; Lee et al. 1980), and have been stocked in several lakes (Yukon Department of the Environment 2006); they do not occur in NU. The NT distribution area for Rainbow Trout was amended to include the stocked populations found in Great Slave Lake and the surrounding area and extended south to the AB border to include the Slave River, Little Buffalo River, and Seven Mile Lake (Nelson and Paetz 1972; Falk et al. 1973; Falk and Low 1981; R.L. & L. Environmental Services Ltd. and Environmental Management Associates 1985; Stewart 1997, 1999; Little et al. 1998). The present status of the NT stocked populations is

unknown, as is whether self-sustaining populations have developed and/or colonised any other locations.

Notes

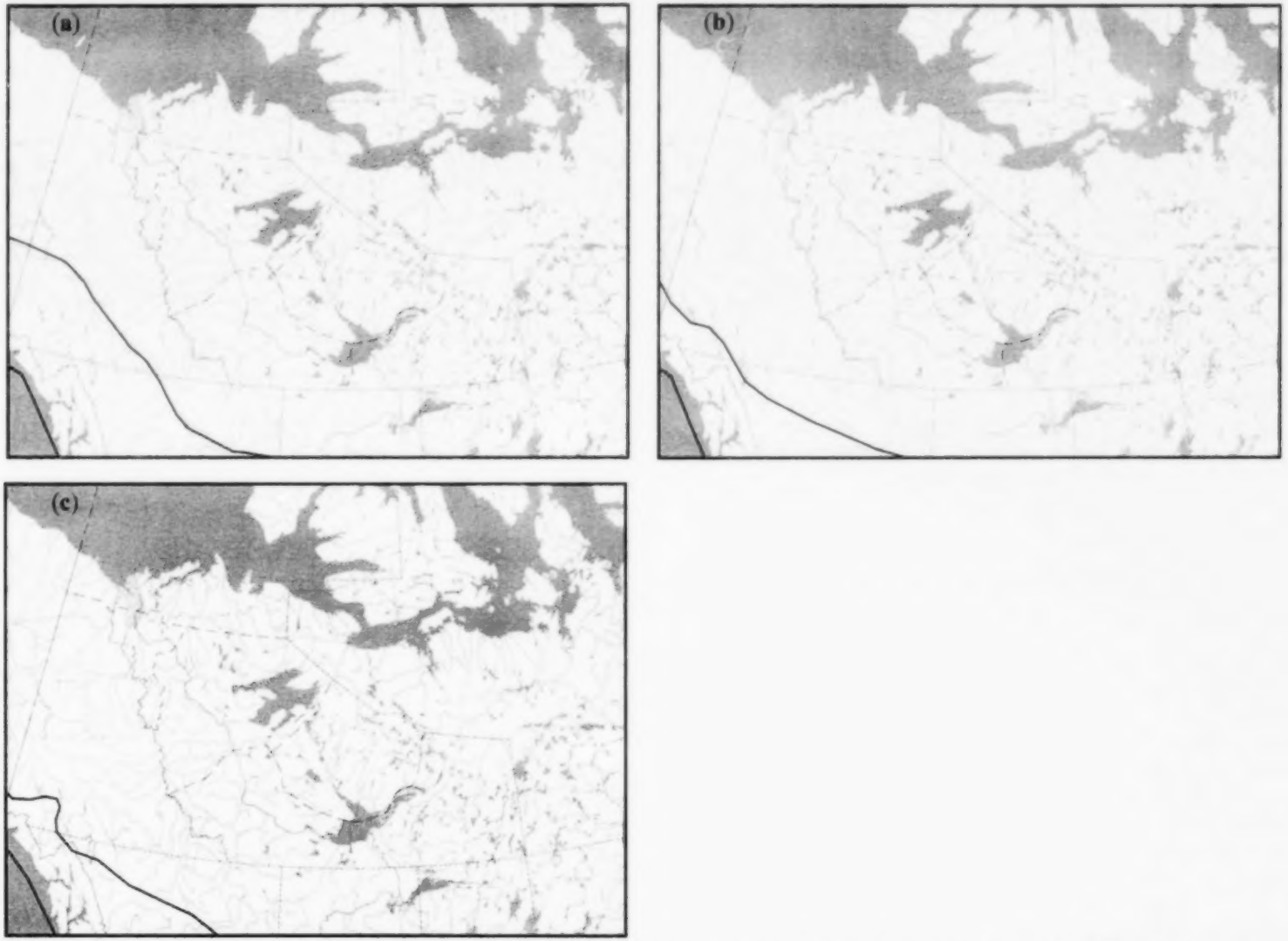

Figure 61. Previously published distributions of Rainbow Trout (*Oncorhynchus mykiss*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

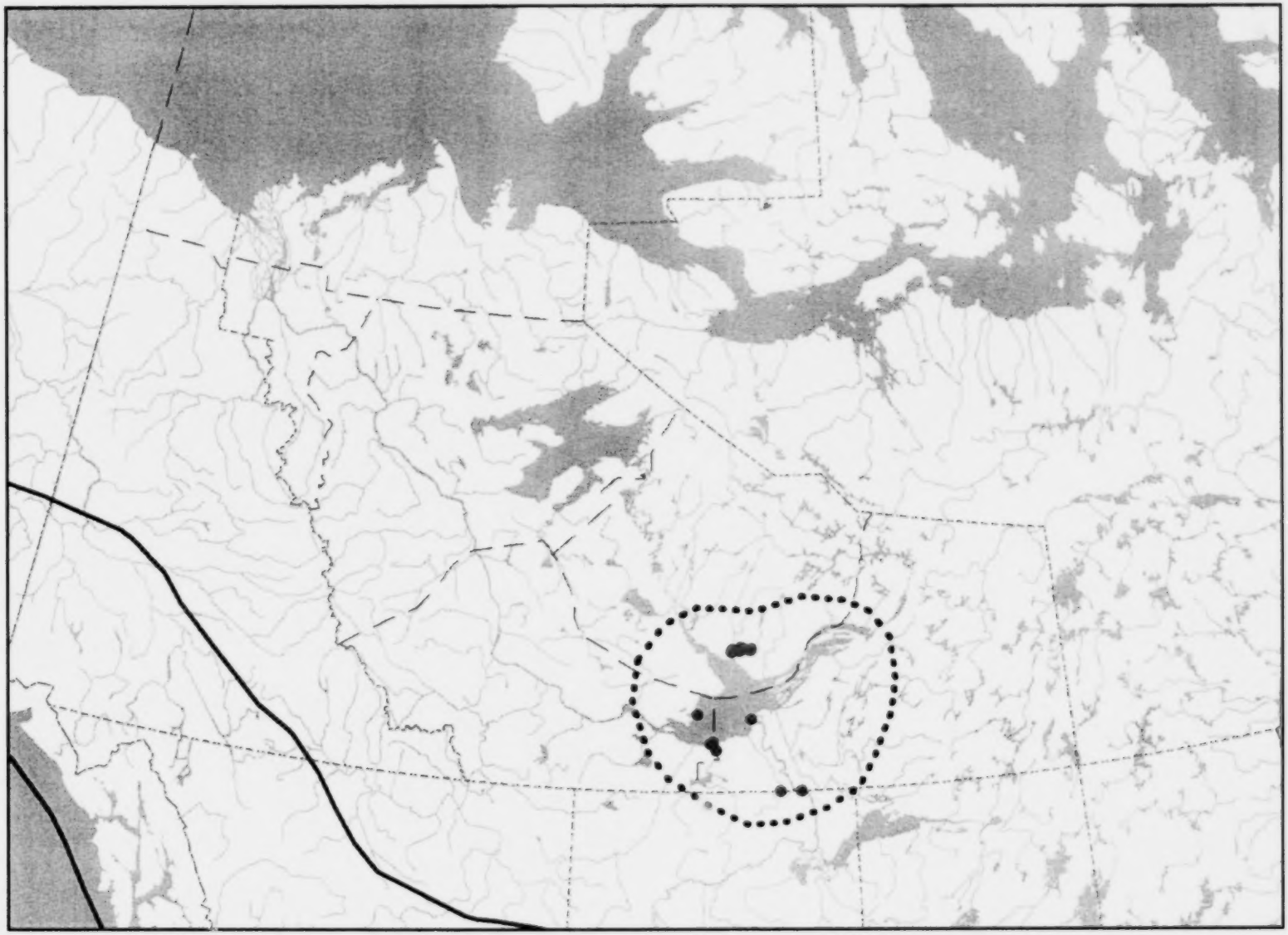

Figure 62. Revised distribution boundaries for Rainbow Trout (*Oncorhynchus mykiss*) based on point distributions and previously published boundaries.

Oncorhynchus nerka (Walbaum 1792) [Figs. 63, 64]

Common Names: Sockeye Salmon (E, anadromous), Kokanee (E, freshwater-resident), saumon rouge (F, anadromous), kokani (F, freshwater-resident).

Conservation Status: Regional: Vagrant (usual range not in the NT) (Working Group on General Status of NWT Species 2006).

Habitat: Rare in the NT, this species exhibits anadromous (Sockeye Salmon) and freshwater-resident (Kokanee) life history types. The anadromous form is not known to spawn or permanently reside in the NT. Anadromous populations spawn from August to September, primarily in rivers connected to lakes and occasionally along the shores of lakes in areas with groundwater upwelling. Females build redds in gravel substrates in riffle areas. After spawning, the nest is covered by the female. Eggs hatch up to five months later, depending on water temperature. Young remain in the substrate for 2—3 weeks, emerging between April and June. They then either remain in their natal stream or move to a nearby lake. Those that remain in the stream hide in the substrate during the day and emerge at night. After 1—2 years they undertake a spring migration to the sea, where they remain for 2—4 years. Once maturity is reached they return to their natal stream to spawn. Freshwater-resident populations have habitat requirements similar to their anadromous counterparts. Instead of migrating to the sea, juveniles remain in the lake to feed and mature. Both freshwater-resident and anadromous adults die after spawning (Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: The Sockeye Salmon occurs throughout Alaska south of Point Hope, and as strays along the North Slope (Mecklenburg et al. 2002). This species also occurs in Pacific drainages of the southwestern YT (Scott and Crossman 1973; Lee et al. 1980), and in the Kitikmeot area of NU (Stephenson 2005, 2006). The occurrence of Kokanee in Great Slave Lake was most consistent with downstream emigration from lakes in northern BC via the Peace River (Babaluk et al. 2000). Therefore, the extension south along the Peace River was added to the distribution to account for the possibility that individual fish may survive migration through dams from the Thutade, Williston and Arctic lakes in BC (Babaluk et al. 2000). The distribution for Sockeye Salmon was also extended east along the coast line to Bathurst Inlet, NU, and north to Sachs Harbour on Banks Island and around Prince Albert Sound on Victoria Island (Stephenson 2005, 2006).

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Figure 63. Previously published distributions of Sockeye Salmon (*Oncorhynchus nerka*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

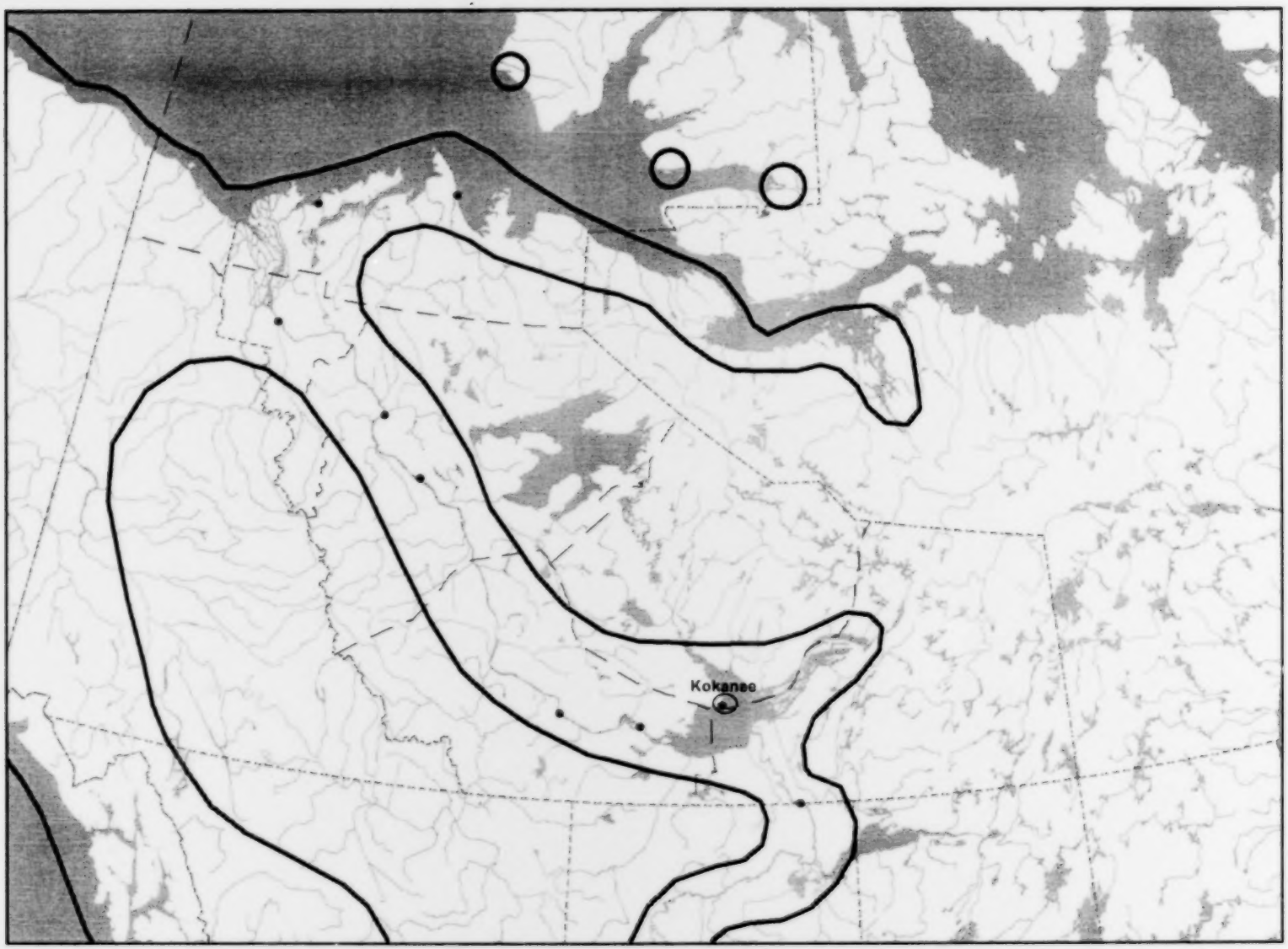

Figure 64. Revised distribution boundaries for Sockeye Salmon (*Oncorhynchus nerka*) based on point distributions and previously published boundaries. Note the occurrence of the freshwater-resident form, Kokanee, in Great Slave Lake; the remaining points represent the anadromous form.

Oncorhynchus tshawytscha (Walbaum 1792) [Figs. 65, 66]

Common Names: Chinook Salmon (E), saumon chinook (F), sahtì eda (DR) (Dogrib Divisional Board of Education 1996).

Conservation Status: Regional: Vagrant (usual range not in the NT) (Working Group on General Status of NWT Species 2006).

Habitat: Occurring in the Mackenzie Delta region and as presumable strays in southern areas of the NT, Chinook Salmon exhibit an anadromous life history type. Spawning populations have not been found in the NT. In the Yukon River, spawning occurs from late July to early September in large streams over substrates of fine gravel, coarse gravel, and cobble (Evans et al. 2002). Females construct a redd in riffle areas with groundwater upwelling at depths between 0.05—7.2 m and velocities between 0.1—1.5 m/s (Healey 1991). The fertilized eggs are covered by the female. Both adults die after spawning. The eggs incubate for up to 159 days depending on water temperature. After hatching, the young remain in the gravel for 2—3 weeks. In the Yukon River they remain in fresh water for 2—3 years before smolting and migrating to sea. They are often found in back eddies of rivers, behind fallen trees, amongst fallen tree roots, or near other areas of bank cover. They move to higher velocity areas in the middle of streams once they grow larger. After migrating to sea they spend time near shore before moving to deeper waters. Females return to spawn after 4—5 years at sea and males after 2—3 years (Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: In Alaska, Chinook Salmon occur south of Point Hope and as strays along the North Slope (Mecklenburg et al. 2002). This species is also found in the YT in drainages to the Bering Sea, Pacific Ocean drainages of the southwest, and as strays along the North Slope (Scott and Crossman 1973; Lee et al. 1980). In NU, they occur in the Kitikmeot area (Coad and Reist 2004; Stephenson 2005, 2006). The NT distribution area for Chinook Salmon was extended south to include the Slave (Little et al. 1998) and Liard rivers (McLeod and O'Neil 1983), and east to include the Anderson River (Lindsey and McPhail 1986). The distribution was also extended east along the coast to Kugluktuk, NU (Stephenson 2005, 2006).

Notes

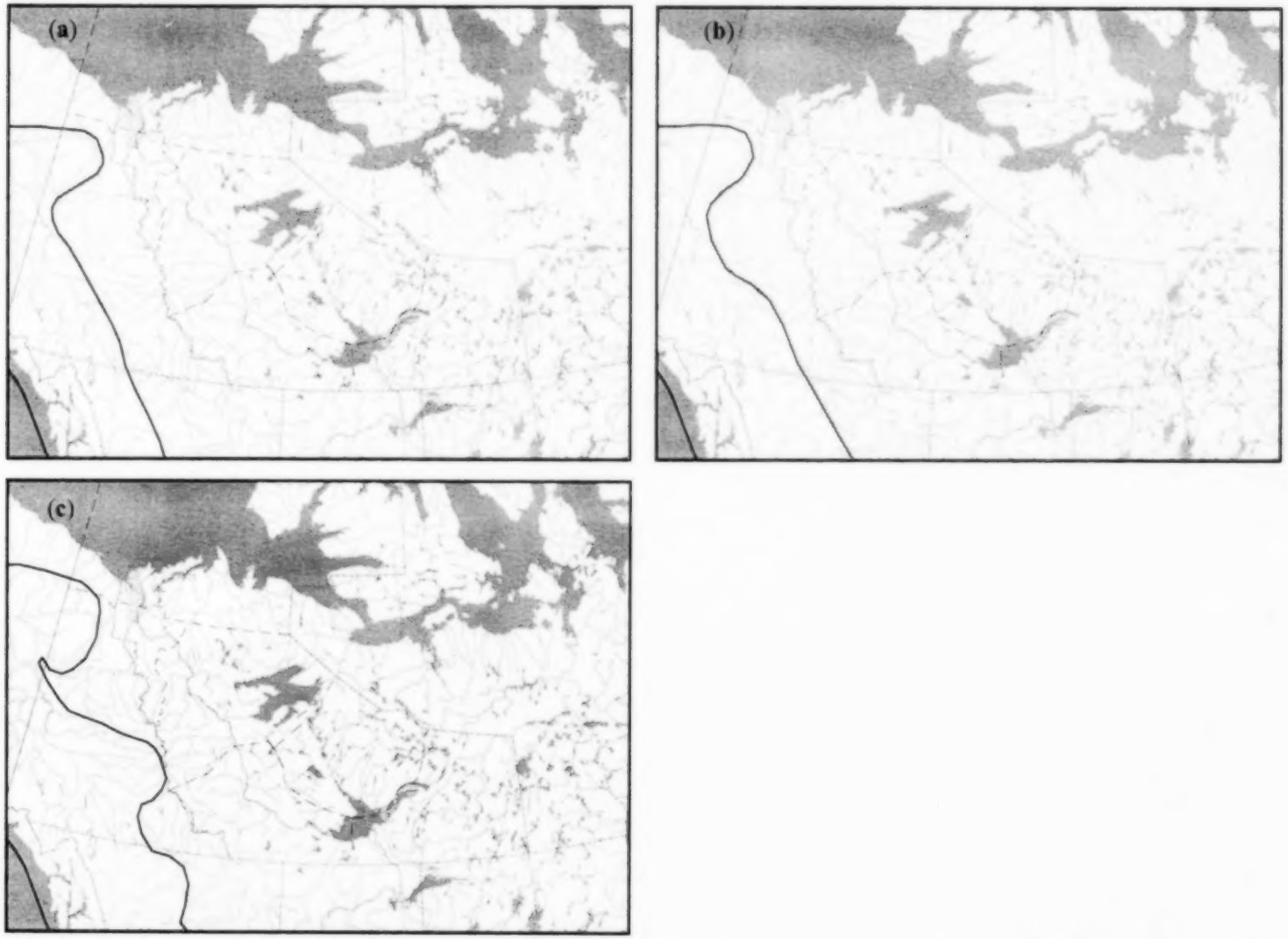

Figure 65. Previously published distributions of Chinook Salmon (*Oncorhynchus tshawytscha*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

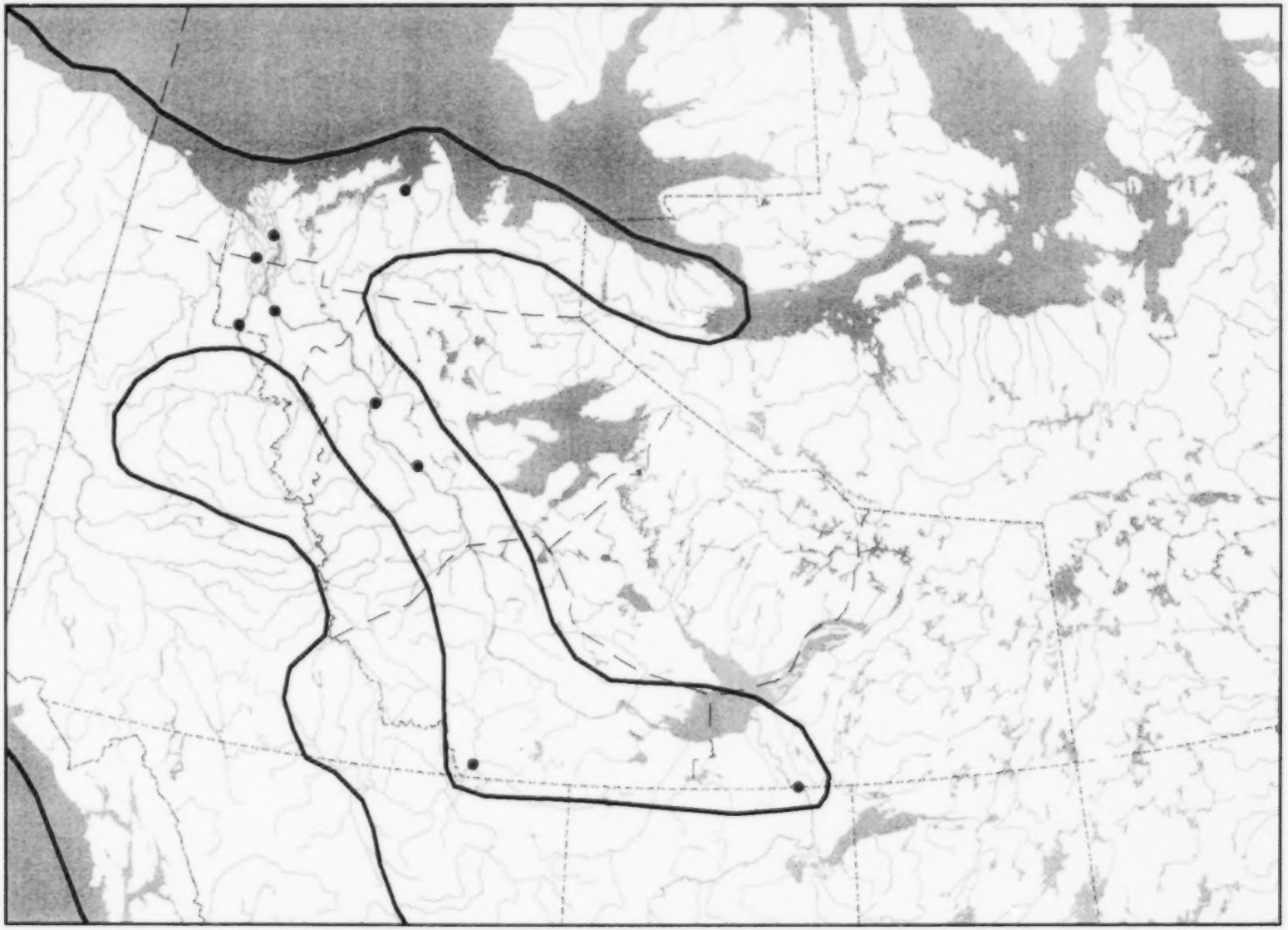

Figure 66. Revised distribution boundaries for Chinook Salmon (*Oncorhynchus tshawytscha*) based on point distributions and previously published boundaries.

Prosopium coulterii (Eigenmann & Eigenmann 1892) [Figs. 67, 68]

Common Names: Pygmy Whitefish (E), ménomini pygmée (F) (Coad 2006).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006); National: Secure (Canadian Endangered Species Conservation Council 2006).

Habitat: Known in the NT only from Great Bear Lake, Pygmy Whitefish exhibit lacustrine and riverine life history types. Little is known of their habitat requirements. They occur in lakes, rivers, and streams in mountainous areas. In rivers and streams they frequently occur in moderate to swift, clear or silty water. In lakes they are common in deep water (>6 m), but have also been found in shallow areas (McPhail and Lindsey 1970). Generally, they are bottom-dwellers tolerant of low oxygen concentrations (Zemlak and McPhail 2006). Spawning occurs in either streams or lakes in summer, fall, or early winter, depending on the area (McPhail and Lindsey 1970). In Alaska, spawning occurs in November and December (Heard and Hartman 1966 cited in Hallock and Mongillo 1998). They likely broadcast their eggs over gravel substrates, similar to other members of the genus (McPhail and Lindsey 1970).

Zemlak and McPhail (2006) observed this species making diel migrations to inshore areas at night in an isolated lake in BC. These migrations may have been made in order to feed, or may indicate that this species is photonegative and unable to use nearshore habitat during daylight (Zemlak and McPhail 2006). Pygmy Whitefish were observed using inshore areas during daylight in a different lake in BC, however it was under conditions of high turbidity (Zemlak and McPhail 2006).

Taxonomic Comments: Mis-identification of young Pygmy Whitefish as either Round Whitefish or Lake Whitefish is possible, thus under-reporting of occurrence is likely.

Distribution Comments: Pygmy Whitefish are found in several deep lakes with disjunct distributions in southern Alaska (Mecklenburg et al. 2002), and occur in similar situations in the southern YT, but do not occur in NU (Scott and Crossman 1973; Lee et al. 1980). Their distribution in deep lakes may be more widespread than is currently documented due to difficult and limited sampling of such areas. The NT distribution area for Pygmy Whitefish was extended to include Great Bear Lake (University of Alberta Museum of Zoology 2005).

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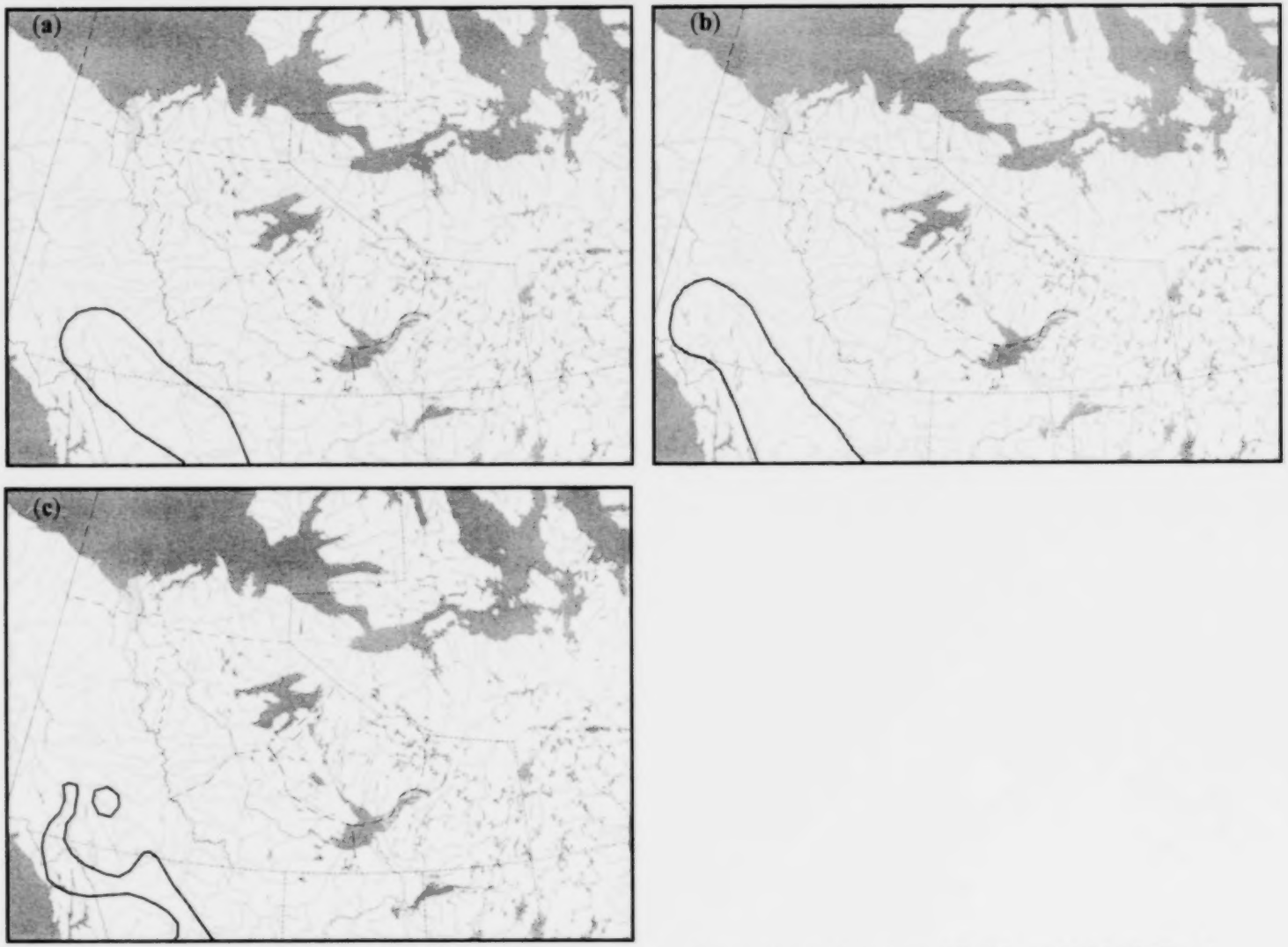

Figure 67. Previously published distributions of Pygmy Whitefish (*Prosopium coulterii*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

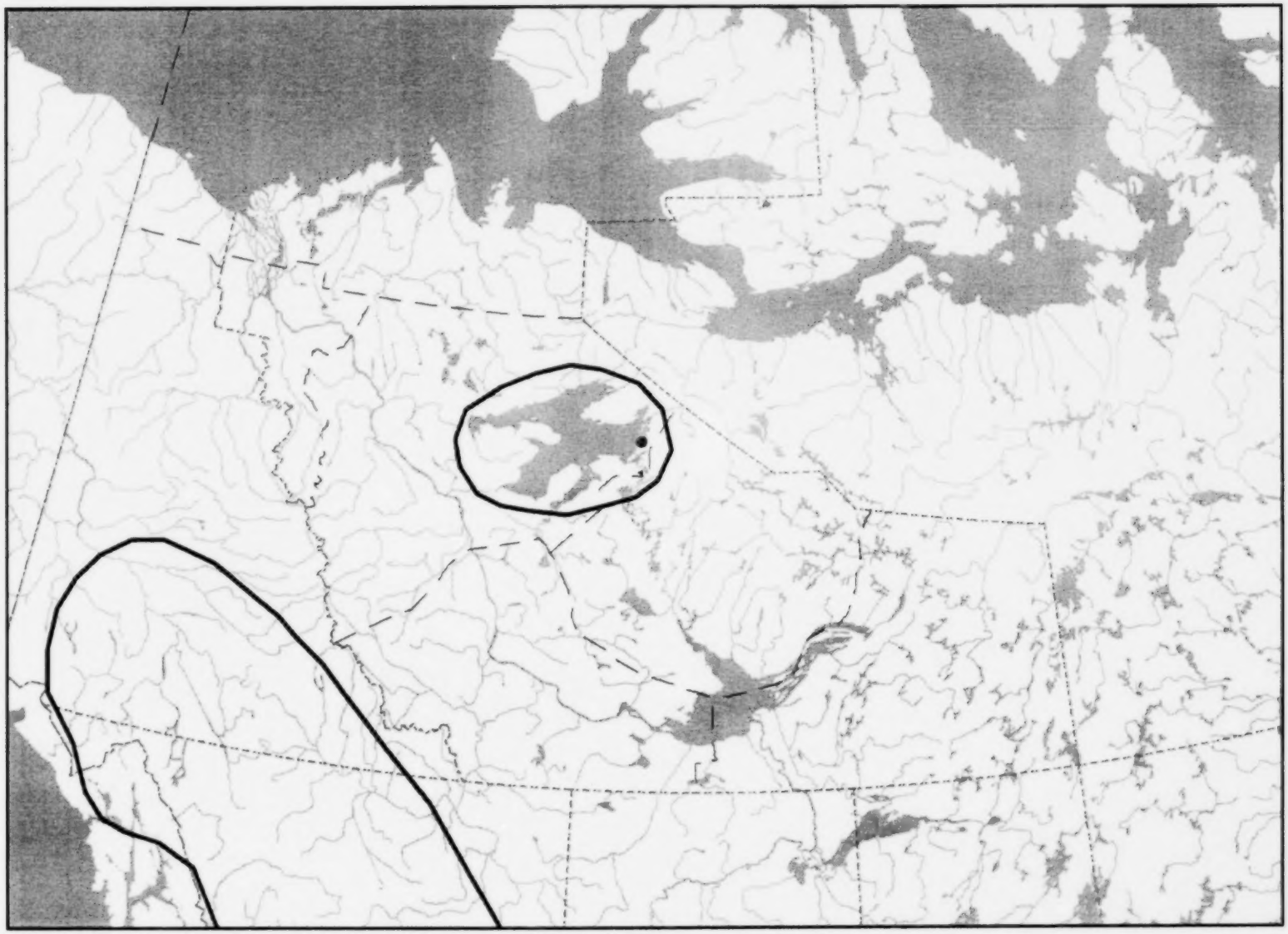

Figure 68. Revised distribution boundaries for Pygmy Whitefish (*Prosopium coulterii*) based on point distributions and previously published boundaries.

Prosopium cylindraceum (Pennant 1784) [Figs. 69, 70]

Common Names: Round Whitefish (E), ménomini rond (F), osungnak (In, Back River), okeugnak (In, Great Bear Lake) (McAllister et al. 1987).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: Distributed throughout the NT, the Round Whitefish exhibits lacustrine, adfluvial, and possibly riverine life history types (Richardson et al. 2001; Evans et al. 2002). Spawning occurs from fall to early winter primarily in lakes but occasionally in streams and rivers. This species generally spawns over substrates of gravel and rubble, but may also spawn over sand and silt in areas with emergent vegetation. Spawning depths may range from 5—10 m but are most often <1 m. Eggs are broadcast over the substrate and hatch in spring between March and May. Young are often found near the bottom over rock, sand, and gravel substrates at depths between 1.5—4.5 m (Richardson et al. 2001). In rivers, juveniles and adults use turbidity, cobble, boulders, debris, and overhanging riparian vegetation for cover. Juveniles prefer calm waters, but as they mature they move into deeper, faster water. Adults prefer velocities between 0.61—0.91 m/s (Evans et al. 2002). Lacustrine adults occur at depths between 7—22 m, typically over rocky substrates, and are often associated with boulders (Richardson et al. 2001).

Taxonomic Comments: None.

Distribution Comments: The Round Whitefish occurs throughout Alaska (Mecklenburg et al. 2002), the YT, and the mainland Kitikmeot and Kivalliq areas of NU (Scott and Crossman 1973; Lee et al. 1980; Stewart and Bernier 1983). The distribution has been extended north and east in the mainland Kivalliq area of NU (MacDonald and Stewart 1980).

Notes

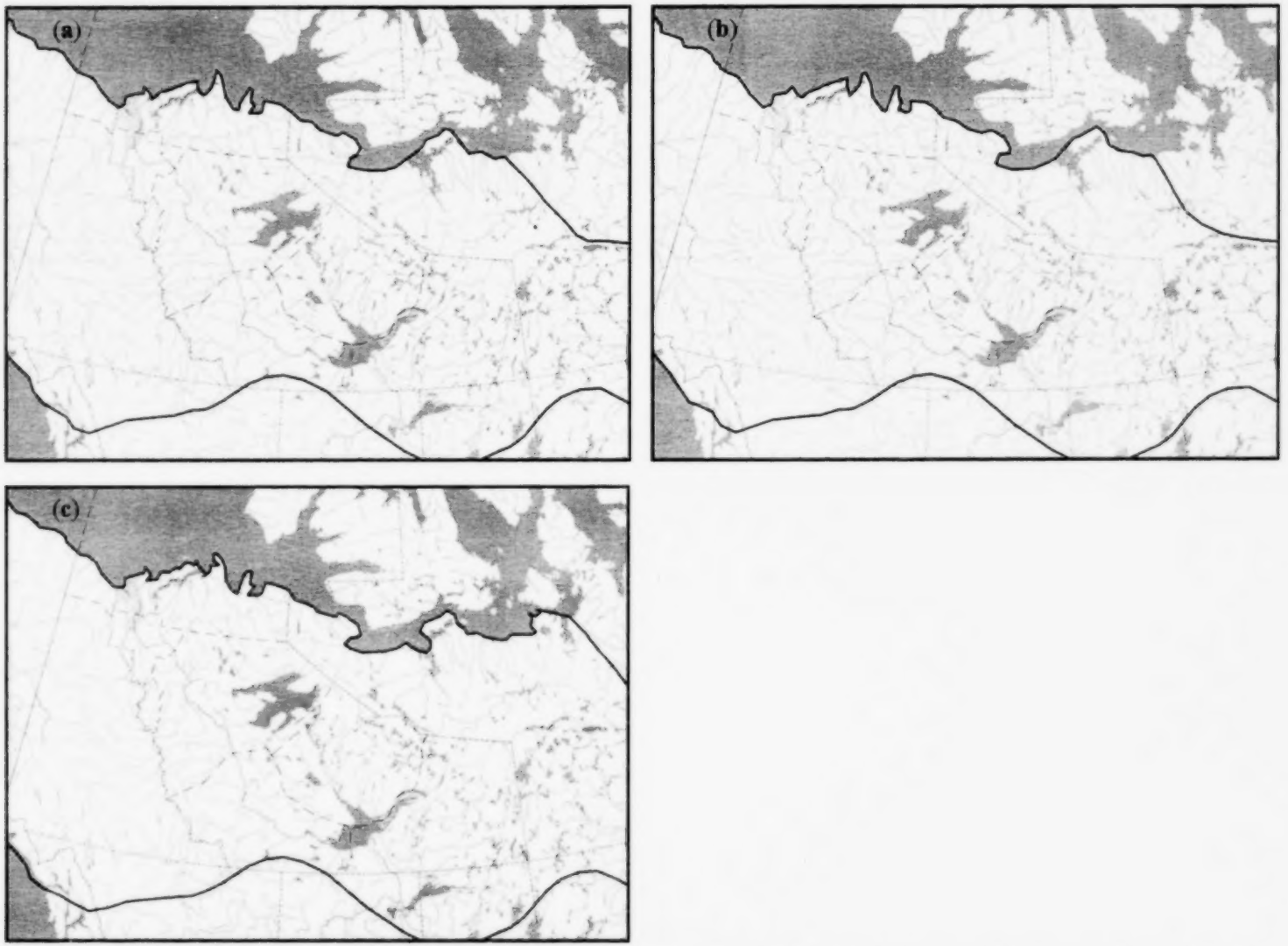

Figure 69. Previously published distributions of Round Whitefish (*Prosopium cylindraceum*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

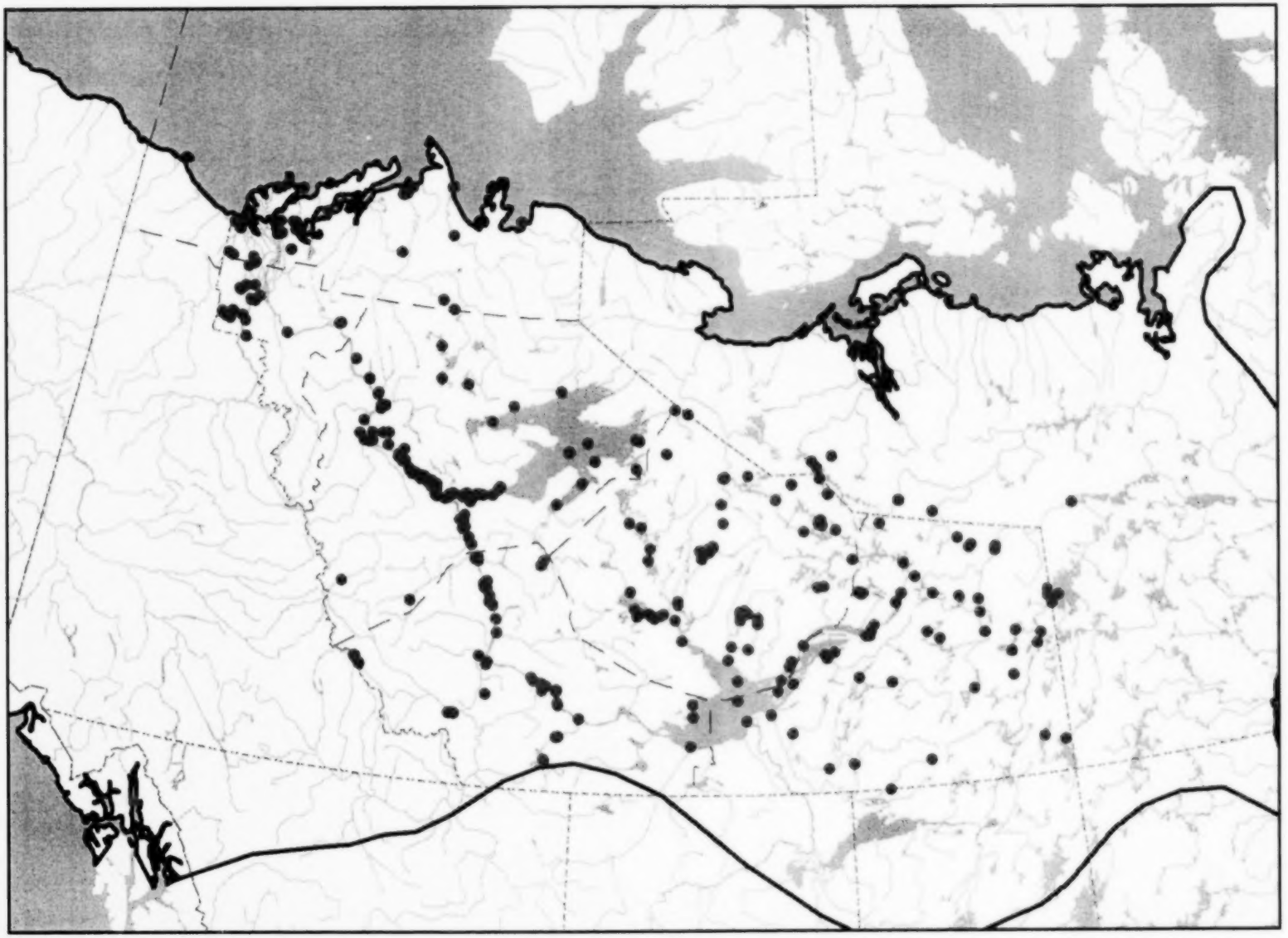

Figure 70. Revised distribution boundaries for Round Whitefish (*Prosopium cylindraceum*) based on point distributions and previously published boundaries.

Prosopium williamsoni (Girard 1856) [Figs. 71, 72]

Common Names: Mountain Whitefish (E), ménomini de montagnes (Coad 2006).

Conservation Status: Not assessed.

Habitat: Distributed in the Mackenzie River system, Mountain Whitefish exhibit lacustrine, adfluvial, and riverine life history types, but are rarely found in lakes in the NT. Spawning occurs between September and February over gravel substrates in riffle areas of streams at depths between 0.1—1 m, and water velocities between 0.89—1.02 m/s. Eggs hatch in spring (March—May) and fry inhabit stream edges and backwaters for their first several weeks. Riverine young rear in areas with undercut banks in backwaters or pools over cobble, rubble, gravel, and silt substrates. After hatching, adfluvial young move downstream to the lake or reservoir, where they remain until they reach maturity and return to the river to spawn. Riverine juveniles are found in areas with slow to moderate water velocities over substrates of sand and gravel. They inhabit pool areas at depths <3 m and use undercut banks, woody debris, and aquatic vegetation as cover. Adults occupy areas with moderate to fast water velocities, depths <3 m, cobble and gravel substrates, and also use undercut banks, woody debris, and aquatic vegetation as cover. They overwinter in pool areas of rivers (Evans et al. 2002).

Taxonomic Comments: Mis-identification as Round Whitefish (*P. cylindraceum*), and thus under-reporting of occurrence is very possible.

Distribution Comments: Mountain Whitefish do not occur in Alaska or NU. They most likely occur in the extreme southeastern portions of YT, but their overall distribution in this area is unknown. The NT distribution area for Mountain Whitefish was extended north to Oscar Creek along the Mackenzie River, north to the Mountain River, west along the Flat River and through Prairie, Harrison, and Marengo creeks, and east along the Trout River (Jessop et al. 1974; Stein et al. 1973a; Stewart 1996). The distribution area along the BC border is considered to be uncertain.

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Figure 71. Previously published distributions of Mountain Whitefish (*Prosopium williamsoni*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

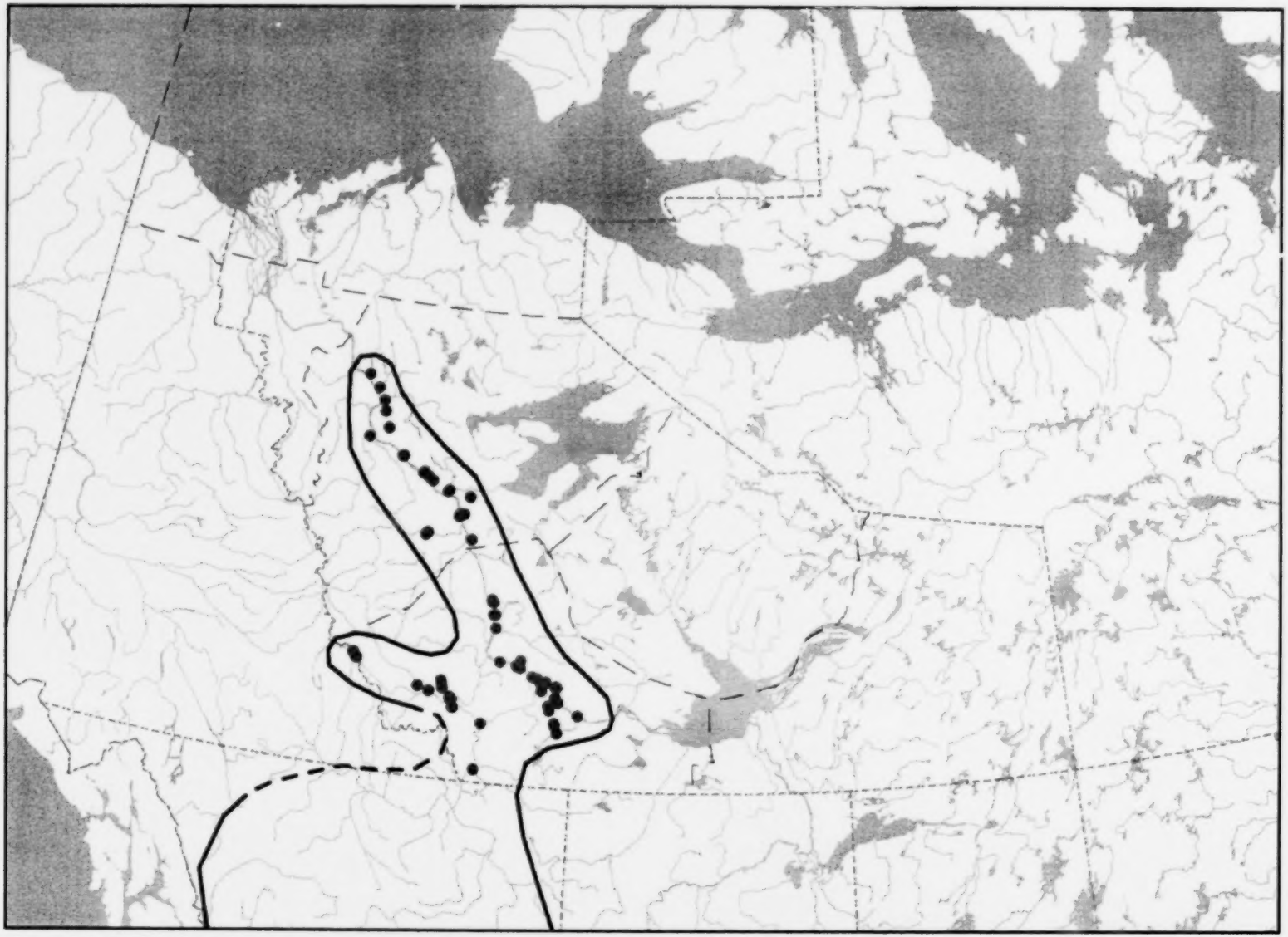

Figure 72. Revised distribution boundaries for Mountain Whitefish (*Prosopium williamsoni*) based on point distributions and previously published boundaries.

Salvelinus alpinus (Linnaeus 1758) [Figs. 73, 74]

Common Names: Arctic Char (E), omble chevalier (F), erlakukpik (In, Tuktoyaktuk), kaloarpok (In, Mackenzie and Anderson rivers), ikalukpik (In, Thelon and Back rivers), eqäluk (In, Mackenzie District) (McAllister et al. 1987), qalukpik (Inv) (The Community of Aklavik et al. 2000), evitaruk (Inv), qaluaqpak (Inv, land locked), ekalukpik (Inv, land locked), dhik'ii (GW) (D. McGowan pers. comm. 2006), âuededele (NS), lugededélé (NS) (Bayha and Snortland 2004), łıwezǫǫ dek'oo (DR) (Dogrib Divisional Board of Education 1996), red fish (E, local name), silver trout (E, local name) (Bayha and Snortland 2004).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006), Hornaday and Kuujjua rivers: Sensitive (Working Group on General Status of NWT Species 2006).

Habitat: Found in the coastal regions of the NT, Arctic Char exhibit anadromous, freshwater-resident lacustrine (Richardson et al. 2001; Evans et al. 2002), and possibly riverine (Stewart and Bernier 1983) life history types. Northern populations of anadromous Arctic Char spawn in lakes from mid-August to October (Stewart and Bernier 1988). Spawning occurs over substrates of cobble and gravel at depths between 0.5—6 m (Evans et al 2002). Females build a redd into which eggs are deposited, fertilized, and covered with gravel. After spawning, adults overwinter in lakes and the following spring migrate downstream to the sea to feed (Evans et al. 2002). This species may also spawn and overwinter in deep pools in rivers (Stewart and Bernier 1983). Eggs hatch in spring between late March and April. Young remain in the gravel for several weeks, emerging around the time of ice breakup. Young likely remain on the spawning grounds until later in the summer when they move to rocky areas in the littoral zone. They remain in fresh water an average of 4—5 years before making their first migration to the sea (Evans et al. 2002).

Northern populations of lacustrine char spawn at the same time and over the same substrates as anadromous populations at depths between 0.5—10 m. Spawning may also occur over substrates of silt, mud, and clay, sometimes in association with vegetation. Spawning methods and time of hatching are the same as anadromous populations. Fry remain in the gravel until mid-July. Young inhabit nearshore shallow waters and also occur in the pelagic zone. Cobble, rubble, and boulder substrates are used as cover. Juveniles are benthic and occur at depths >5 m. Boulder, cobble, and rubble substrates and vegetation are used for cover. As juveniles mature they become pelagic. Adults are most common at depths <5 m over boulder, rubble, and cobble substrates. They shift from the pelagic zone in the summer to benthic and nearshore habitats in the fall. Dwarf lacustrine adults occur in shallow (0—5 m) nearshore areas in the summer and the pelagic zone in fall. Spawning occurs at greater depths (30 m) than normal Arctic Char and may take place up to several months later (Richardson et al. 2001).

Taxonomic Comments: Despite several studies (McPhail 1961; Reist et al. 1997) that provided conclusive morphological evidence for separating Arctic Char and Dolly Varden as distinct species, some authors suggest these are part of a species complex which should be recognized as one taxon (*e.g.*, Brunner et al. 2001 based on genetic surveys). The approach adopted here is that the two are distinct at the species level, high diversity exists

within each (and thus convergence in identifying features and other characters is possible), and that hybridization and introgression have occurred, therefore genetic similarity may in some cases occur secondarily. Accordingly, until studies are widespread and definitive these should be treated as distinct. See also Dolly Varden taxonomic comments. There is considerable confusion in the usage of both local and English common names throughout the distribution of this and other char species (*i.e.*, Bull Trout and Dolly Varden). Depending upon the usage and language this may reflect mis-identifications in the vernacular, or a generic reference to chars (see also below).

Distribution Comments: Arctic Char are found in lakes on the North Slope, Seward Peninsula, and southwestern areas of Alaska where all appear to be either land-locked or non-anadromous if access to the sea is possible (Mecklenburg et al. 2002). The only known occurrence in the YT is as two semi-connected land-locked populations in two lakes on the North Slope (Fig. 74). Arctic Char are widespread throughout NU east and north of our area (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area boundaries are based on work completed by Reist et al. (2002) and refined by more recent unpublished information. Based upon extensive taxonomic analyses and an understanding of ecological requirements, old distribution points for Arctic Char and Dolly Varden were re-examined herein with the following conclusions resulting: (1) all occurrences of anadromous and/or riverine chars noted for the Mackenzie Delta, western margins of the Tuktoyaktuk Peninsula, and the YT North Slope are considered to represent Dolly Varden; (2) all lacustrine occurrences of chars west of the Mackenzie River along the YT North Slope in Canada are considered to represent Arctic Char (only two locations known); (3) all coastal, riverine, and/or lacustrine occurrences of chars east of the Tuktoyaktuk Peninsula within NT waters are considered to be Arctic Char (with one possible exception, namely rivers flowing to Coronation Gulf, and the Coppermine and Tree rivers), and this species generally extends north and eastwards from this area; (4) confusion exists with respect to differentiating Dolly Varden and Bull Trout (see respective write ups), thus the local language common names noted above for inland locations may in fact refer to these two species rather than Arctic Char; and (5) the confusion in usage of common names as Arctic Char, Dolly Varden, or Bull Trout also exists in much of the scientific literature for this area. Accordingly, great care must be taken to ensure that new records are assigned to the proper species of char, and that earlier records are reassigned to the correct species. The NT distribution area for Arctic Char was extended west along the northern coast to include occurrences in the vicinity of Liverpool Bay (Sellers 1990). An occurrence documented in Great Bear Lake (Stewart 1996) as Dolly Varden was changed to Arctic Char based on identification criteria (Reist unpubl. 2006). Wherever possible, voucher specimens and key identification characters should be collected, with identifications verified by qualified experts. Some lakes in the southern NT have been stocked with Arctic Char (dotted boundary, Fig. 74) (see also the distribution comments for Dolly Varden).

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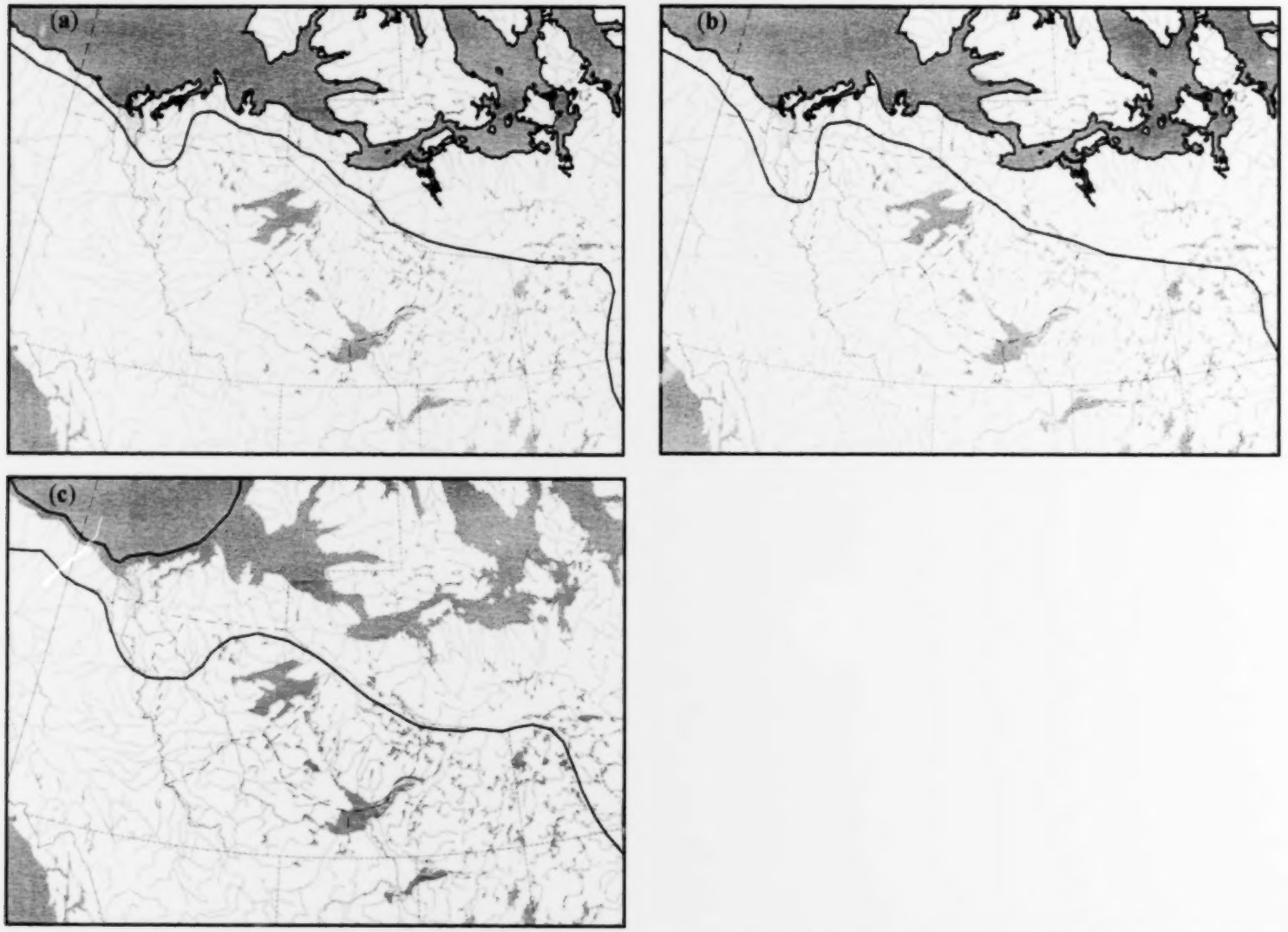

Figure 73. Previously published distributions of Arctic Char (*Salvelinus alpinus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973). Note that the original distributions were based upon taxonomic confusion between Arctic Char, Dolly Varden and Bull Trout, thus these distributions can only be considered to reflect distributions of char generally (excluding Lake Trout).

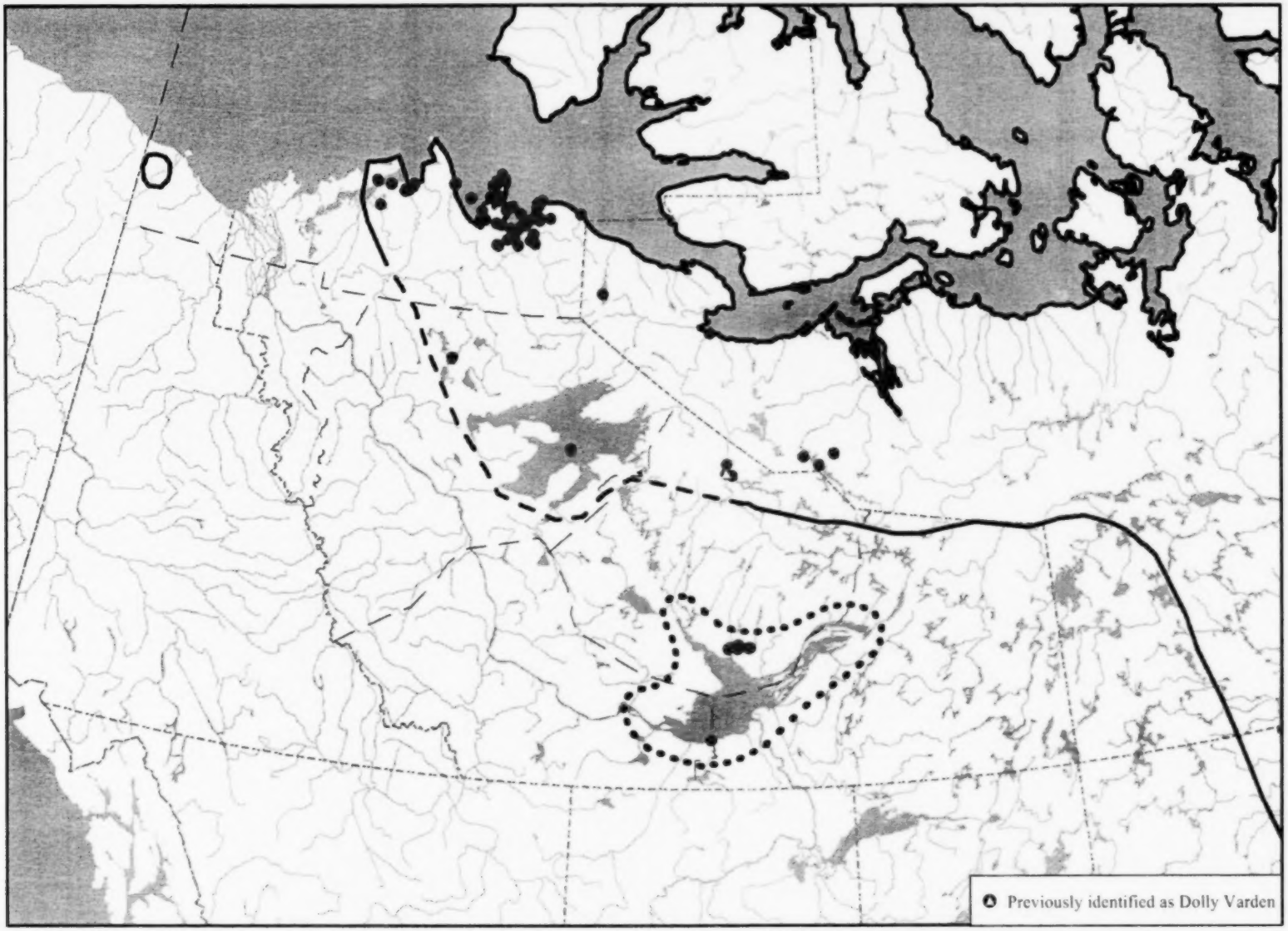

Figure 74. Revised distribution boundaries for Arctic Char (*Salvelinus alpinus*) based on point distributions and previously published boundaries. All previous points along the Mackenzie River identified as Arctic Char are considered to be either Dolly Varden or Bull Trout (see next species distributions).

Salvelinus confluentus (Suckley 1859) [Figs. 75, 76]

Common Names: Bull Trout (E), omble à tête plate (F) (Coad 2006), dehgá sahba (NS) (Bayha and Snortland 2004).

Conservation Status: Regional: May be at risk (Working Group on General Status of NWT Species 2006).

Habitat: Bull Trout occur in the southwest portion of the NT and in the Mackenzie River system north to Great Bear River and perhaps beyond. This species exhibits riverine, fluvial, adfluvial, and anadromous (rarely, and not known to occur in the NT) life history types (Richardson et al. 2001; Evans et al. 2002). All life history types spawn in cold tributary rivers and streams between late summer and early fall. Spawning occurs over gravel and cobble substrates at depths between 0.2—0.6 m. Eggs are deposited in redds constructed in slow moving waters often in association with groundwater upwelling. After hatching, young remain in the substrate for several weeks. Upon emergence, adfluvial young move to nursery streams where they spend their first 1—4 years before moving into lakes. They occur in shallow water (0.15—0.5 m), near cover providing substrates of large, loose cobble. Riverine adults are found in similar habitats. Woody debris and substrate are used for cover by young and juveniles; overhead cover is used by juveniles only. In lakes, adfluvial adults inhabit profundal and littoral areas (Richardson et al. 2001).

Taxonomic Comments: In the past, this species was often confused with Dolly Varden (*S. malma*) in the upstream Mackenzie River south to the NT/AB border (Reist et al. 2002). The two taxa are distinct, and work along the Mackenzie River Valley is refining our understanding of both this distinctness and their respective distributions. All three char species (*S. alpinus*, *S. confluentus*, and *S. malma*) must be identified using detailed criteria, and voucher specimens should be submitted to qualified experts for confirmation of identity. Furthermore, hybridization between Dolly Varden and Bull Trout is known (Haas and McPhail 1991), thus specimens with ambiguous suites of identification characters are possible where the two co-occur.

Distribution Comments: Bull Trout are present in Pacific drainages of extreme southeastern Alaska (Mecklenburg et al. 2002). They occur in the extreme southeastern YT (Lee et al. 1980), and may occur in Pacific drainages of the extreme southwestern YT; they are not found in NU. The NT distribution area for Bull Trout is based on work completed by Reist et al. (2002) and refined by more recent unpublished information. The distribution was further refined to include the river basins of the Gayna and Carcajou rivers (Mochnacz and Reist 2007) where this species and Dolly Varden occur in the same river sub-basin. All previous distributional points from the literature and museum specimens for areas west of the refined distribution for Arctic Char (Fig. 74) were considered to be Dolly Varden if northern, or Bull Trout if southern. The northern edge of the Bull Trout distribution shown here is uncertain and may consist of a disjunction, a contact zone, or an overlapping intergradation of distribution with Dolly Varden. Local language names noted for inland Arctic Char may actually refer to either Bull Trout or Dolly Varden. See notes for Dolly Varden and Arctic Char also.

Notes

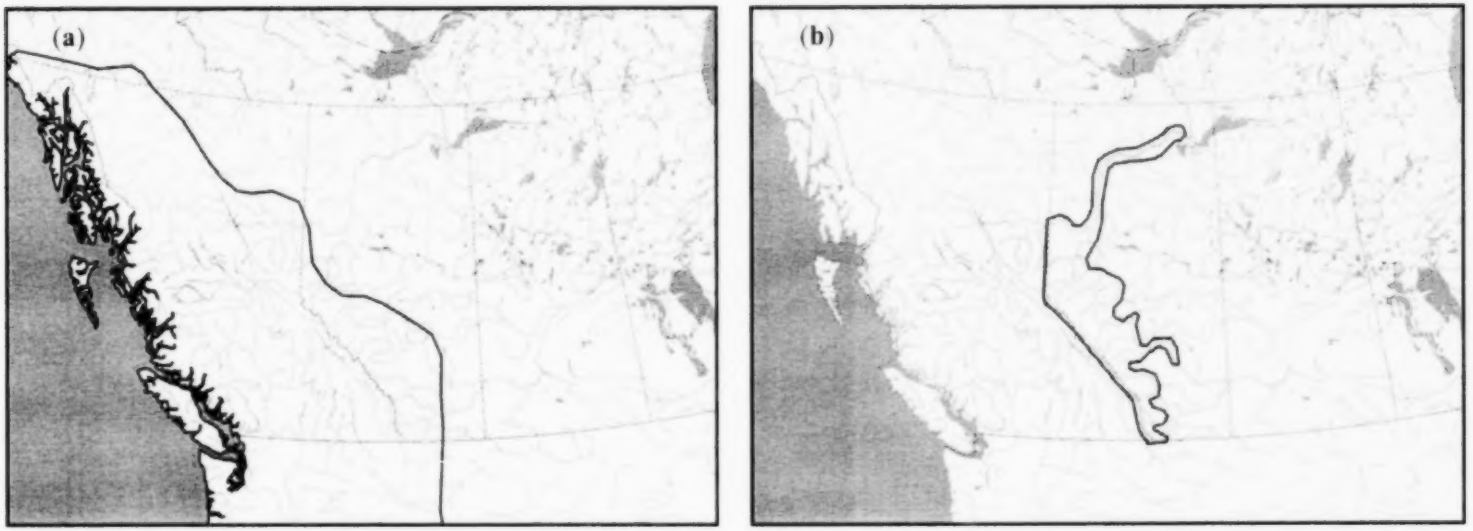

Figure 75. Previously published distributions of Bull Trout (*Salvelinus confluentus*) modified from (a) Lee et al. (1980), and (b) Nelson and Paetz (1992).

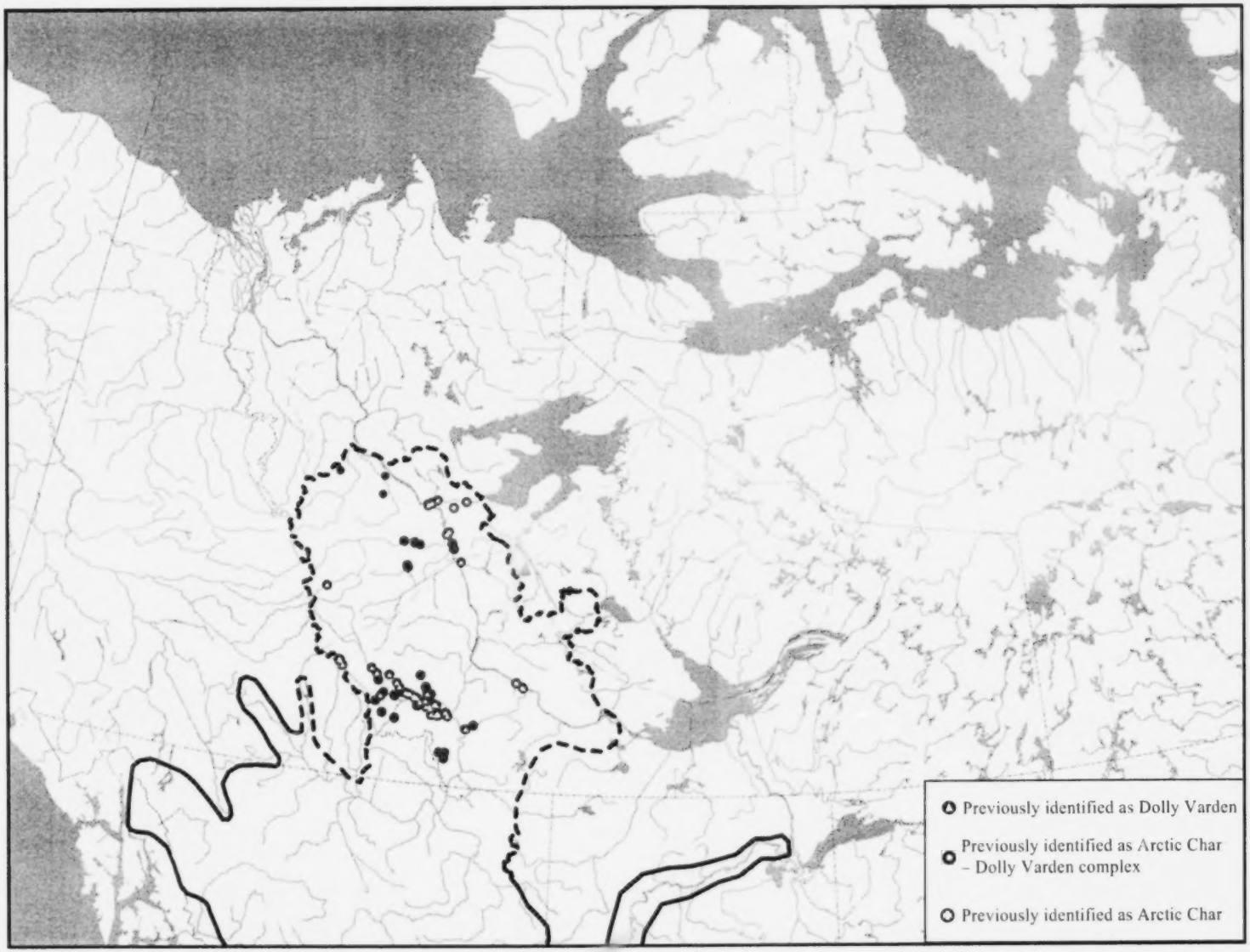

Figure 76. Revised distribution boundaries for Bull Trout (*Salvelinus confluentus*) based on point distributions and previously published boundaries.

Salvelinus fontinalis (Mitchill 1814) [Figs. 77, 78]

Common Names: Brook Trout (E), omble de fontaine (F).

Conservation Status: Regional: Alien.

Habitat: Brook Trout were first introduced in the NT into Seven Mile Lake in 1949, into the Little Buffalo River in 1960 or 1961, and into Polar Lake in 1971 (Crossman 1991). They exhibit riverine, lacustrine, and, if inhabiting coastal areas, anadromous life history types. In northern areas, spawning occurs in September primarily in streams. Lakes containing gravel areas with groundwater upwelling may also be used. The female constructs a redd in the gravel substrate of a riffle area. The fertilized eggs are deposited into the redd and covered by the female. The eggs hatch in spring and the alevins remain in the substrate until the yolk-sac is absorbed. After emerging from the gravel, the young remain near the spawning area until they reach a length of approximately 5 cm (McPhail and Lindsey 1970). They then move to establish territories in shallow areas along the stream edge, in eddies, or in mid-stream areas with slow currents over gravel and cobble substrates. Lacustrine young also move to shallow water after emergence. As they grow, they expand their territories and move to deeper waters. Those that rear in streams and migrate to lakes usually do so once they have reached a length of 8—15 cm (generally in their second or third summer) (Ford et al. 1995).

Adults are most active in early morning and late afternoon. During the day they stay out of the current, seeking cover behind rocks, or under overhanging logs, and cutbanks. They prefer water temperatures between 14—19°C (Schofield et al. 1989 cited in Ford et al. 1995). If temperatures exceed 20°C, they seek cooler areas in deeper water or larger water bodies (Scott and Crossman 1973).

Taxonomic Comments: None.

Distribution Comments: Brook Trout do not occur in Alaska or the YT; in NU, they occur in the Belcher Islands area only (Scott and Crossman 1973; Government of Nunavut 2002). The current status of the early introductions is unknown, and this species may no longer be extant in this area.

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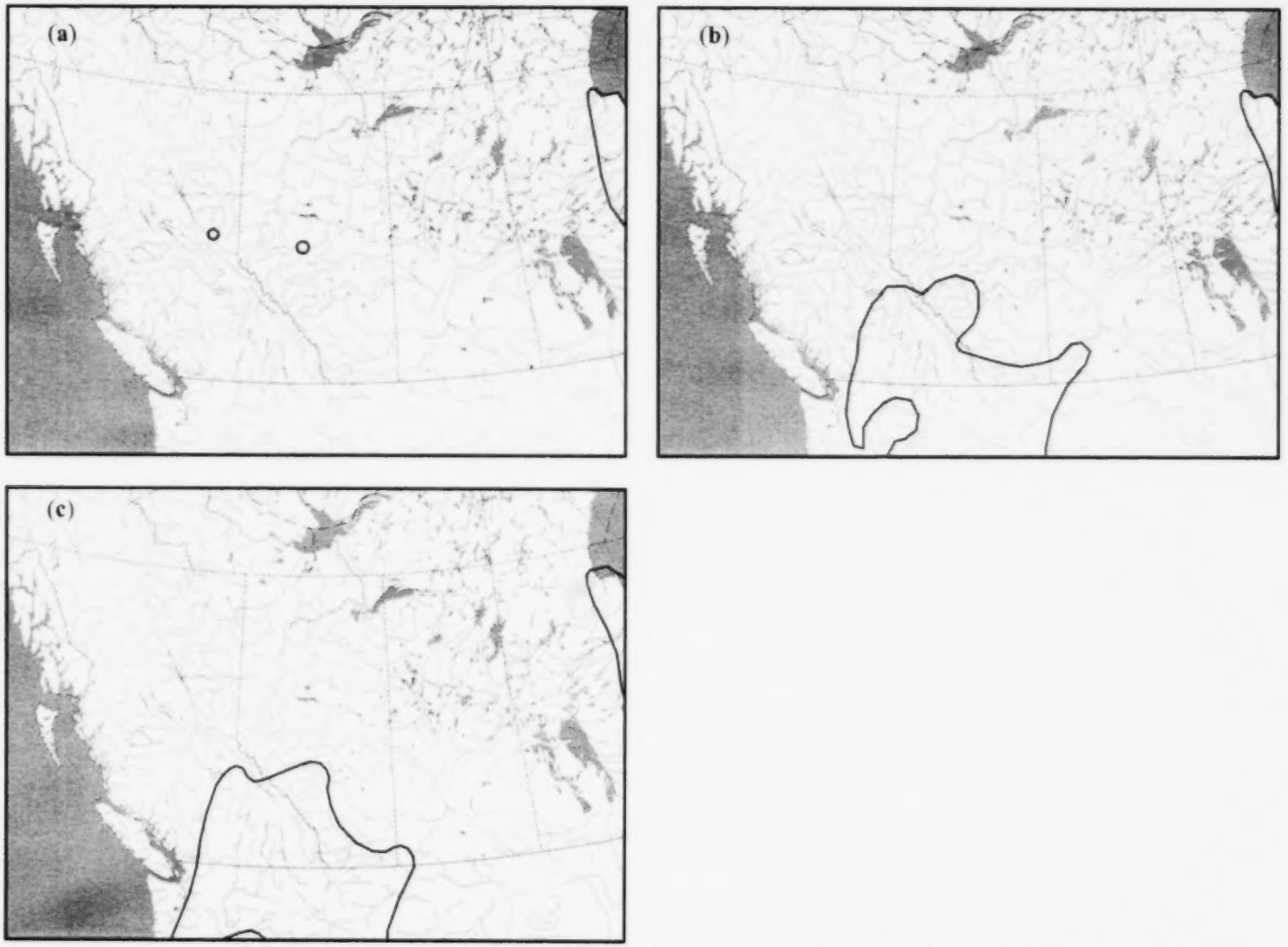

Figure 77. Previously published distributions of Brook Trout (*Salvelinus fontinalis*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

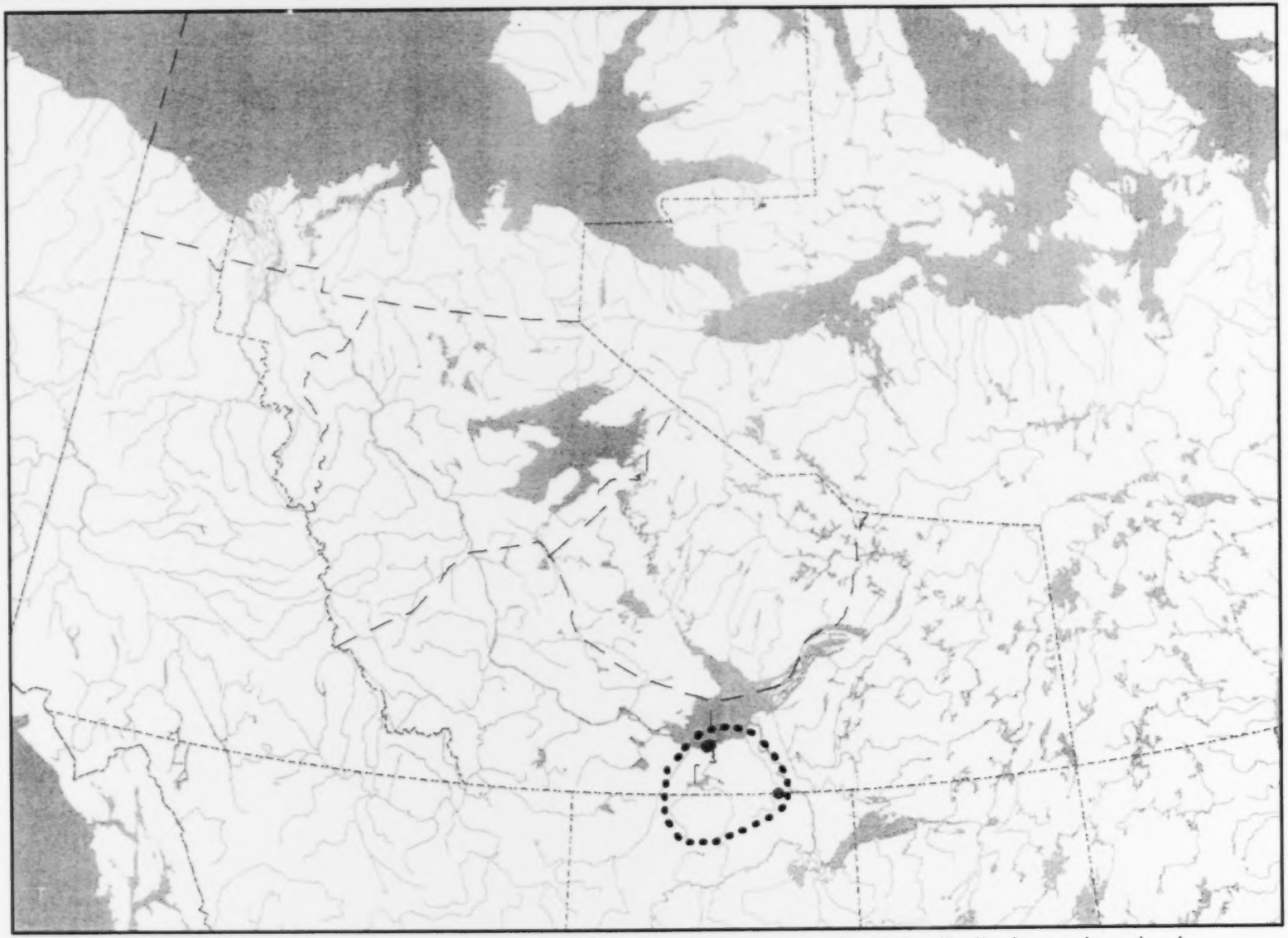

Figure 78. Revised distribution boundaries for Brook Trout (*Salvelinus fontinalis*) based on point distributions and previously published boundaries.

Salvelinus malma (Walbaum 1792) [Figs. 79, 80]

Common Names: Dolly Varden (E), omble malma (F) (Froese and Pauly 2006), qalukpik (Inv) (The Community of Aklavik et al. 2000), evitaruk (Inv), qaluaqpak (Inv, land locked), ekalukpik (Inv, land locked) (D. McGowan pers. comm. 2006), dhik'ii (GW) (Gwich'in Renewable Resource Board 1997), dehgá sahba (NS) (Bayha and Snortland 2004).

Conservation Status: Regional: Sensitive (Working Group on General Status of NWT Species 2006); National: Secure (Canadian Endangered Species Conservation Council 2006).

Habitat: Distributed in the northwest region of the NT, Dolly Varden exhibit anadromous and riverine life history types (lacustrine forms are rare but present in Alaska). Spawning occurs from mid-August to October in upstream reaches of rivers in association with perennial springs. Females construct a redd in gravel substrates into which the eggs are deposited, fertilized, and covered. Spawning takes place at depths ≥0.2 m in strong currents (0.6 m/s) and/or springs at water temperatures between 0—8°C. Eggs hatch in spring and young emerge from the substrate in May or June to begin feeding along stream margins. Their first summer is likely spent near the spawning grounds. Juveniles feed throughout the river system during the summer. They have been found in shallow pools with low velocities (<0.3 m/s) over medium to coarse rock substrates adjacent to flowing water (>0.5 m/s). Instream and bank vegetation, shade, instream tundra slumps, and rocks are used for cover (Richardson et al. 2001; Evans et al. 2002).

After three years in fresh water they become anadromous, unless they are fast growing males, in which case they become sexually mature and freshwater-resident (residual) (Reist et al. in prep. cited in Evans et al. 2002). Anadromous populations migrate to sea in June and July to feed. They remain close to shore at a depth of approximately 1.5 m. Both anadromous and riverine populations overwinter in areas where thermal springs prevent the water from freezing. These areas have an average depth of 0.5 m and are very important as most of the year (6—8 months) may be spent there (Richardson et al. 2001; Evans et al. 2002). Co-occurring riverine Dolly Varden are smaller than anadromous individuals, and almost all of the riverine fish are males. They spend their summer feeding in tributaries and return to the spawning grounds in fall (Richardson et al. 2001; Evans et al. 2002). Isolated populations have been found spawning in November and December at water temperatures between 3.5—8°C, depths between 0.15—0.45 m, and velocities >1.0 m/s (Evans et al. 2002).

Taxonomic Comments: Previously confused with Arctic Char (*S. alpinus*) in areas west of the Mackenzie River (Reist et al. 1997) and with Bull Trout (*S. confluentus*) in the upstream Mackenzie River south to the NT/AB border (Reist et al. 2002). See notes for Arctic Char and Bull Trout. Two taxonomic forms of Dolly Varden are known and designated as sub-species. That present in NT and northern YT waters is *Salvelinus malma malma* (northern Dolly Varden).

Distribution Comments: The northern form of Dolly Varden is widespread throughout the North Slope and western Alaska and grades into the southern form present in Pacific

drainages of southern Alaska (Mecklenburg et al. 2002); additional interior forms may be present in interior waters. Northern Dolly Varden are restricted to northward draining waters of the YT (*i.e.*, North Slope and Peel River system); interior forms may be present in central YT waters (Yukon River drainages), and a southern form is present in extreme southwestern areas. Char specimens indistinguishable from northern Dolly Varden both morphologically and genetically are present in some rivers draining into Coronation Gulf (Kitikmeot area, NU) where they co-occur with Arctic Char. The details of this situation (*e.g.*, disjunct Dolly Varden, hybridized or introgressed population) are unresolved as yet (Reist unpubl. 2006). The NT distribution area for Dolly Varden is based on work completed by Reist et al. (2002) and refined by more recent unpublished information. The distribution was further refined to include the Gayna River (Mochnacz and Reist 2007) where this species and Bull Trout occur in the same river sub-basin. Species occurrences for Bull Trout, Arctic Char and Dolly Varden were plotted as points. Any point that fell within the Dolly Varden boundary was reclassified to Dolly Varden unless there was no uncertainty with the identification validity of the original source. An occurrence documented in Great Bear Lake (Stewart 1996) as Dolly Varden was changed to Arctic Char based on identification criteria (Reist unpubl. 2006). See notes for Arctic Char and Bull Trout also. All distribution points on the map for this species (Fig. 80) from the Mackenzie Delta and the Peel River system are confirmed as Dolly Varden. Points further upstream in the Mackenzie River proper, although likely to be Dolly Varden, are unconfirmed and may possibly represent Bull Trout. The upstream distribution in the Peel River, although uncertain, likely includes the entire basin where suitable habitat exists. The upstream distribution along the Mackenzie River Valley is uncertain and may be disjunct, contact, or overlap the northern edge of the known distribution of Bull Trout. Both Dolly Varden and Arctic Char are actively cultured and sometimes intentionally hybridized. Pure and possibly interbred strains have been stocked in some waters in the NT (Crossman 1991) and YT (Yukon Department of Environment 2006). The occurrence at the mouth of the Hay River represents a stocked specimen (likely from Polar Lake) and may be Arctic Char (Crossman 1991; Stewart 1999). The current status of such stockings in NT waters is unknown. Local language names noted for inland Arctic Char may actually refer to either Dolly Varden or Bull Trout.

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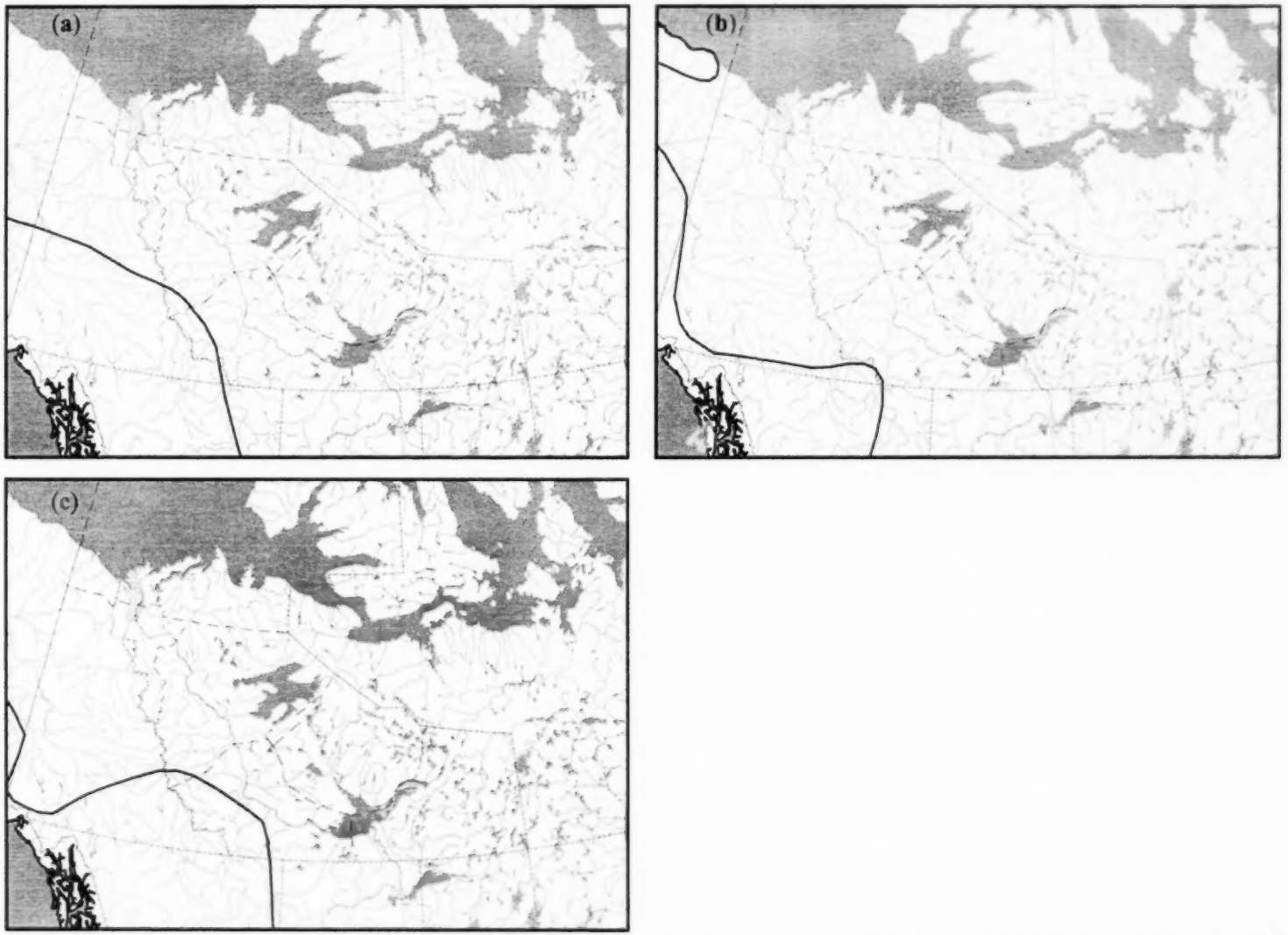

Figure 79. Previously published distributions of Dolly Varden (*Salvelinus malma*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

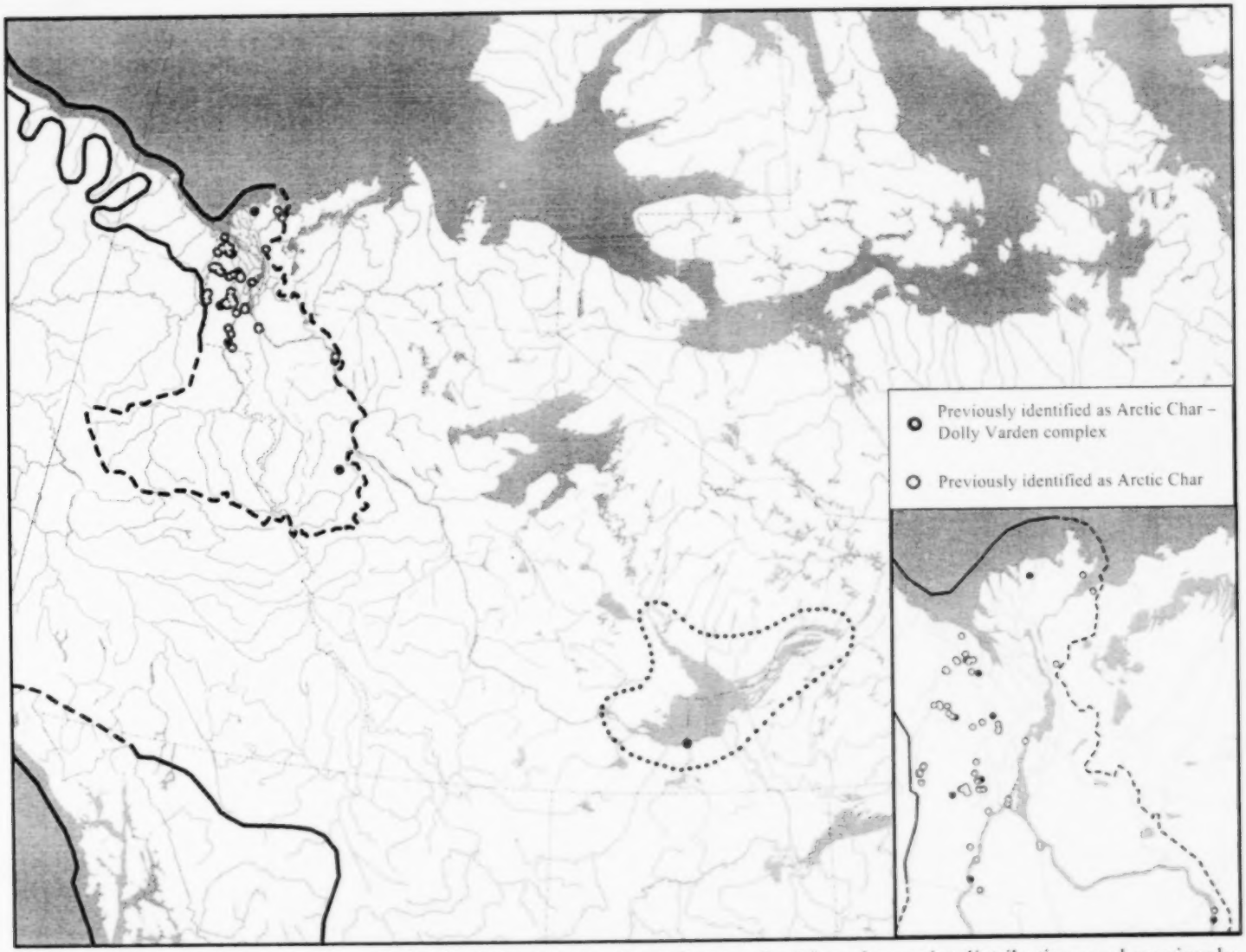

Figure 80. Revised distribution boundaries for Dolly Varden (*Salvelinus malma*) based on point distributions and previously published boundaries.

Salvelinus namaycush (Walbaum 1792) [Figs. 81, 82]

Common Names: Lake Trout (E), touladi (F), isok (In, Tuktoyaktuk) (McAllister et al. 1987), iqaluakpak (Inv) (The Community of Aklavik et al. 2000), ehohok (Inv) (D. McGowan pers. comm. 2006), vit (GW) (VanGerwen-Toyne 2002), sahba (NS) (Bayha and Snortland 2004), łıwezǫǫ (DR) (Dogrib Divisional Board of Education 1996), trout (E, local name) (Dogrib Divisional Board of Education 1996; Bayha and Snortland 2004).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: Widely distributed in the NT, the Lake Trout exhibits lacustrine, riverine (rare in the NT), and adfluvial life history types (Richardson et al. 2001; Evans et al. 2002) with multiple forms occurring in larger lakes (Blackie et al. 2003). Spawning generally occurs from September to October in shallow inshore areas of lakes (Richardson et al. 2001), but may occur as early as late July (Stewart and Bernier 1983). River spawning is rare but known to occur at the mouth of the Hay River (Evans et al. 2002), and likely in the South Nahanni River (D.A. Watkinson pers. comm. 2007). In lakes, spawning takes place over substrates of cobble, rubble and large gravel among boulders in areas kept free of sand, silt, clay, and mud by wave action and water currents. Lake Trout spawn at depths ranging from 0.12—>100 m. Fertilized eggs settle into cracks and crevices and hatch in spring. Young remain in the spawning area up to several months and move to deeper areas once the water temperature exceeds 15°C. Young are often found <0.3 m above a sandy substrate, typically inhabiting deeper waters (15—20 m) during the day and shallow areas (5—10 m) at night. Juveniles occur over cobble, boulder, and rubble substrates, usually within 0.3 m of the bottom and often use boulders and woody debris as cover. Adults are generally found in the pelagic zone of lakes at depths >10 m. During the summer they tend to occupy deeper, cooler waters below the thermocline in lakes that stratify. Although they occur in coastal regions of the NT, they have a low salinity tolerance and generally do not migrate to sea (Richardson et al. 2001). In areas where Lake Trout coexist with Arctic Char, hybridization may occur (*e.g.*, Melville Peninsula) (Wilson and Hebert 1993).

Taxonomic Comments: None.

Distribution Comments: Lake Trout are widespread throughout most of Alaska (Mecklenburg et al. 2002), most of the YT, and most of the Kitikmeot and Kivalliq areas of NU (Scott and Crossman 1973; Lee et al. 1980). The northern extent of their distribution in the western Arctic Islands extends to the northern edges of Banks and Victoria islands, and they are present on the largest lake on Steffansson Island (Stewart and Bernier 1982).

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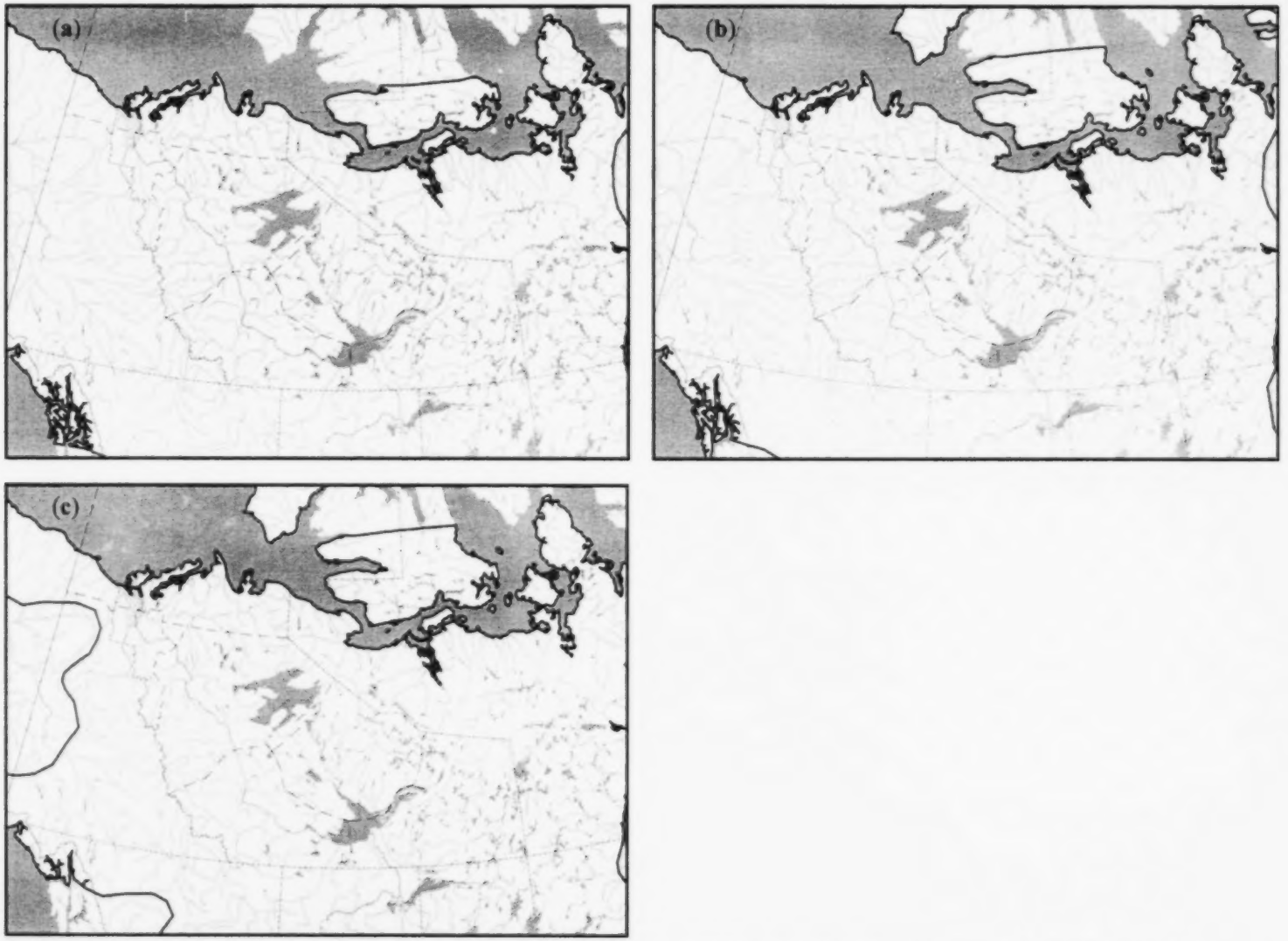

Figure 81. Previously published distributions of Lake Trout (*Salvelinus namaycush*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

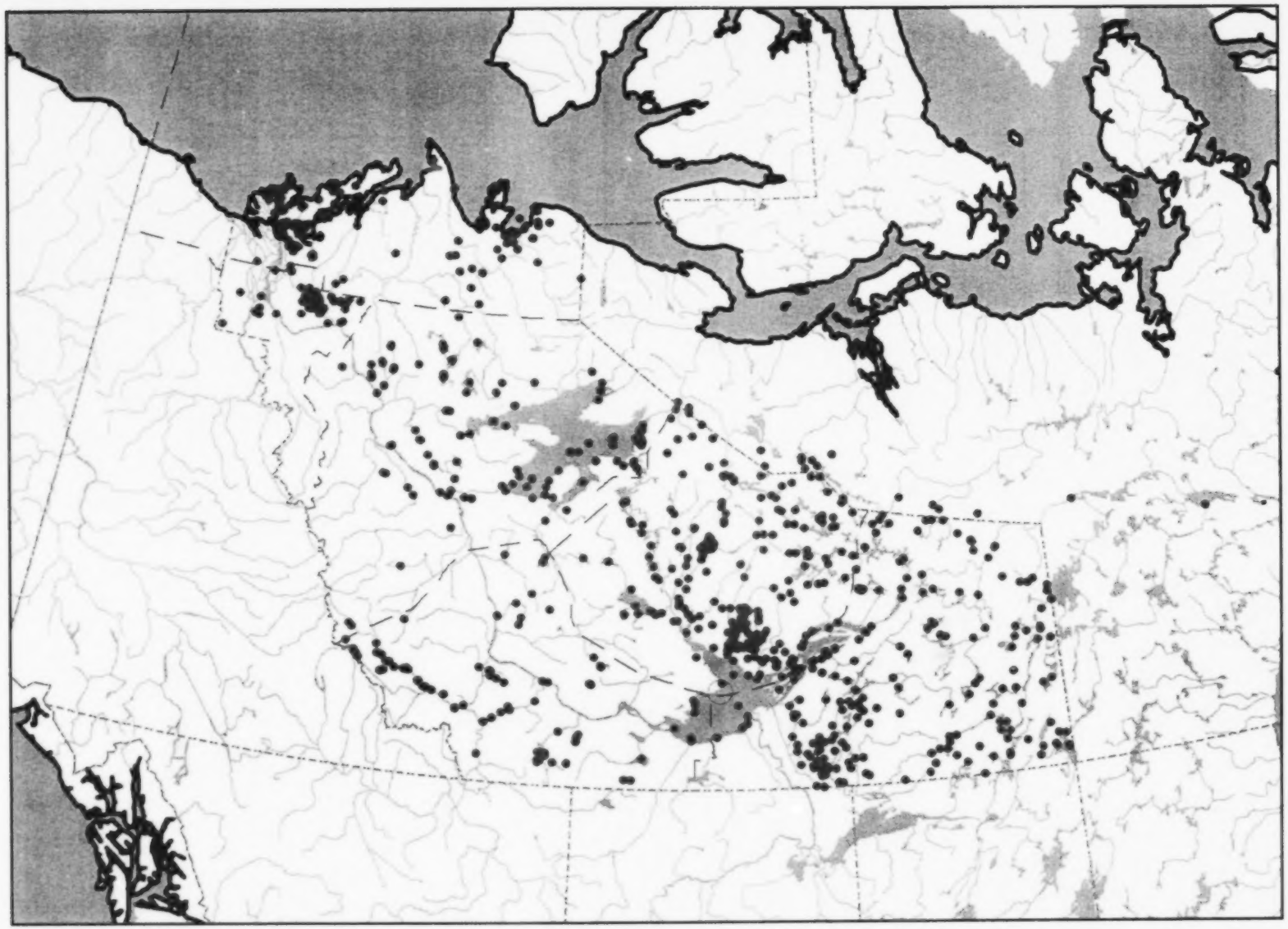

Figure 82. Revised distribution boundaries for Lake Trout (*Salvelinus namaycush*) based on point distributions and previously published boundaries.

Stenodus leucichthys (Güldenstädt 1772) [Figs. 83, 84]

Common Names: Inconnu (E), sténode blanc (F) (Froese and Pauly 2006), si-airryuk (In, Tuktoyaktuk), sierak (In, Tuktoyaktuk), tiktalerk (In, Mackenzie and Anderson rivers), teirark (In, Mackenzie and Anderson rivers) (McAllister et al. 1987), higaq (Inv) (The Community of Aklavik et al. 2000), sigaq (Inv) (D. McGowan pers. comm. 2006), sruh (GW) (Gwich'in Renewable Resource Board 1997; VanGerwen-Toyne 2002), siho (NS), sih (NS) (Bayha and Snortland 2004), ghoòle (DR), weèle (DR), wìile (DR), woòle (DR) (Dogrib Divisional Board of Education 1996), coney (E, local name) (Dogrib Divisional Board of Education 1996; Gwich'in Renewable Resource Board 1997; The Community of Aklavik et al. 2000; VanGerwen-Toyne 2002; Bayha and Snortland 2004), coni (E, local name) (D. McGowan pers. comm. 2006).

Conservation Status: Regional: Sensitive (Working Group on General Status of NWT Species 2006), Upper Mackenzie River and Great Slave Lake stock: May be at risk (Working Group on General Status of NWT Species 2006).

Habitat: Distributed throughout the Mackenzie River basin, Inconnu exhibit anadromous, adfluvial, and possibly riverine life history types in the NT (Richardson et al. 2001; Evans et al. 2002). Anadromous Inconnu spawn in fall, probably over a gravel substrate (Richardson et al. 2001). Eggs hatch in spring and are likely washed downstream with the runoff (Richardson et al. 2001; Evans et al. 2002). Information is lacking on the habitat requirements of YOY and juveniles, but it is assumed their nursery areas are in delta and nearshore coastal regions (Richardson et al. 2001). After spawning, adults migrate downstream (Howland et al. 2000). Tuktoyaktuk Harbour, Kugmallit Bay, and regions of the outer Mackenzie Delta are important overwintering areas (Evans et al. 2002).

Adfluvial Inconnu from Great Slave Lake enter the Slave River in mid-August and spawn in early to mid-October (Richardson et al. 2001; Evans et al. 2002). After spawning they move back to Great Slave Lake where they remain until the following summer. Spawning also occurs in the Buffalo, Hay, Little Buffalo, and Talston rivers. The eggs hatch in spring and it is believed the young reside in the rivers for a minimum of two years (Evans et al. 2002). From there they migrate to Great Slave Lake where they likely inhabit deep, offshore areas (Richardson et al. 2001).

Taxonomic Comments: None.

Distribution Comments: Inconnu are found throughout the large river systems (Yukon and Kuskokwim) of central Alaska (Mecklenburg et al. 2002), and throughout most of the YT; they are not present in NU (Scott and Crossman 1973; Lee et al. 1980). The NT distribution area for Inconnu was extended to include Colville Lake (Bissett 1972; Bissett 1974; Lutra Associates 1989; Bayha and Snortland 2002).

Notes

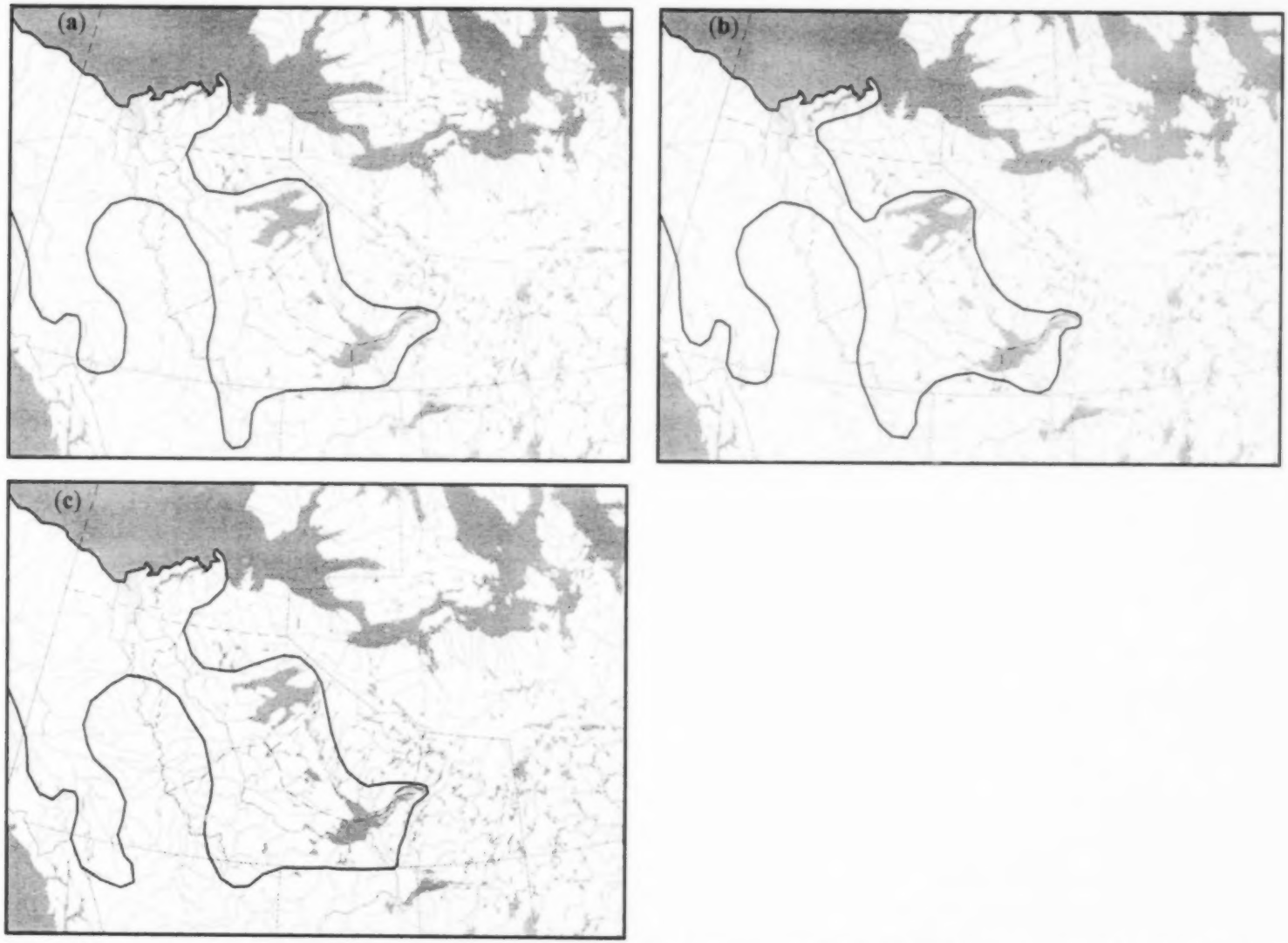

Figure 83. Previously published distributions of Inconnu (*Stenodus leucichthys*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

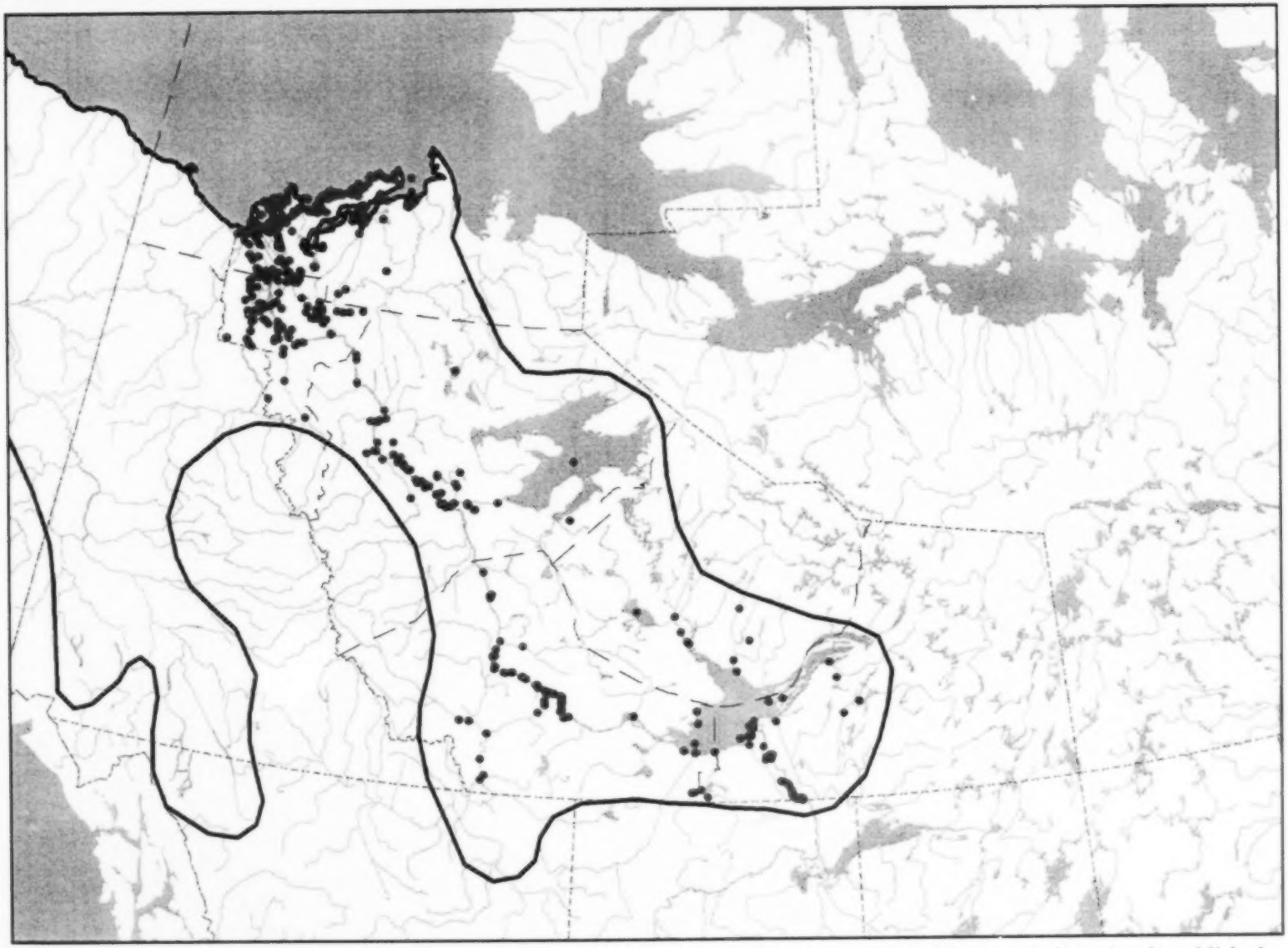

Figure 84. Revised distribution boundaries for Inconnu (*Stenodus leucichthys*) based on point distributions and previously published boundaries.

Thymallus arcticus (Pallas 1776) [Figs. 85, 86]

Common Names: Arctic Grayling (E), ombre arctique (F) (Coad 2006), tchulupa (In, Mackenzie and Anderson rivers), kewlook powak (In, Great Bear Lake) (McAllister et al. 1987), hulukpaugaq (Inv) (The Community of Aklavik et al. 2000), sulukpaugaq (Inv) (D. McGowan pers. comm. 2006), sriijaa (GW) (VanGerwen-Toyne 2002), t'áe (NS), t'áa (NS) (Bayha and Snortland 2004), ts'èt'ı̨ą (DR) (Dogrib Divisional Board of Education 1996), bluefish (E, local name) (Dogrib Divisional Board of Education 1996; VanGerwen-Toyne 2002; Bayha and Snortland 2004), grayling (E, local name) (Dogrib Divisional Board of Education 1996; Bayha and Snortland 2004).

Conservation Status: Regional: Sensitive (Working Group on General Status of NWT Species 2006); National: Secure (Canadian Endangered Species Conservation Council 2006).

Habitat: Widely distributed in the NT, Arctic Grayling exhibit lacustrine, adfluvial, and riverine life history types. Spawning occurs from mid-May to early June, often in streams, over substrates of gravel and rock at varying depths, velocities <1.4 m/s, and water temperatures between 7—10°C. Eggs attach to the substrate and may be covered after fertilization. After hatching, the alevins spend 3—5 days under the substrate. Once they have emerged, they inhabit semi-deep pools and side channels with depths of 0.3—0.5 m, substrates of boulders, cobble, silt, and sand, and velocities <0.8 m/s. Young remain in their natal stream for up to 15 months. Juveniles prefer shallow areas (0.2—0.8 m) with slow moving water and substrates of silt, gravel, rubble, and sand. Post-spawning adults occur in clear water with fine-grained and coarse substrates of rubble and gravel, water velocities between 0.61—1.3 m/s at depths between 1.1—1.52 m. Debris, rubble (7.62—12.70 cm), and cobble (>12.7 cm) are used for cover. Overwintering occurs in deep pools or lakes (Evans et al. 2002).

In lakes, spawning occurs over substrates of coarse sand, gravel, silt, and organic debris at depths between 0.15—0.9 m and is often associated with inlet or outlet streams. Young are found in lotic and littoral areas at depths between 0.2—0.46 m. Adults occur over sand, silt, and gravel substrates and along rocky shorelines. They typically inhabit shallow water (<3 m) and may use overhanging vegetation as cover (Richardson et al. 2001).

Taxonomic Comments: None.

Distribution Comments: Arctic Grayling are widely distributed throughout Alaska (Mecklenburg et al. 2002), the YT, and in the Kitikmeot and Kivalliq areas of NU (Scott and Crossman 1973; Lee et al. 1980). The distribution boundary in eastern NU was adjusted based on MacDonald and Stewart (1980) and Stewart and Bernier (1983).

Notes

Figure 85. Previously published distributions of Arctic Grayling (*Thymallus arcticus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

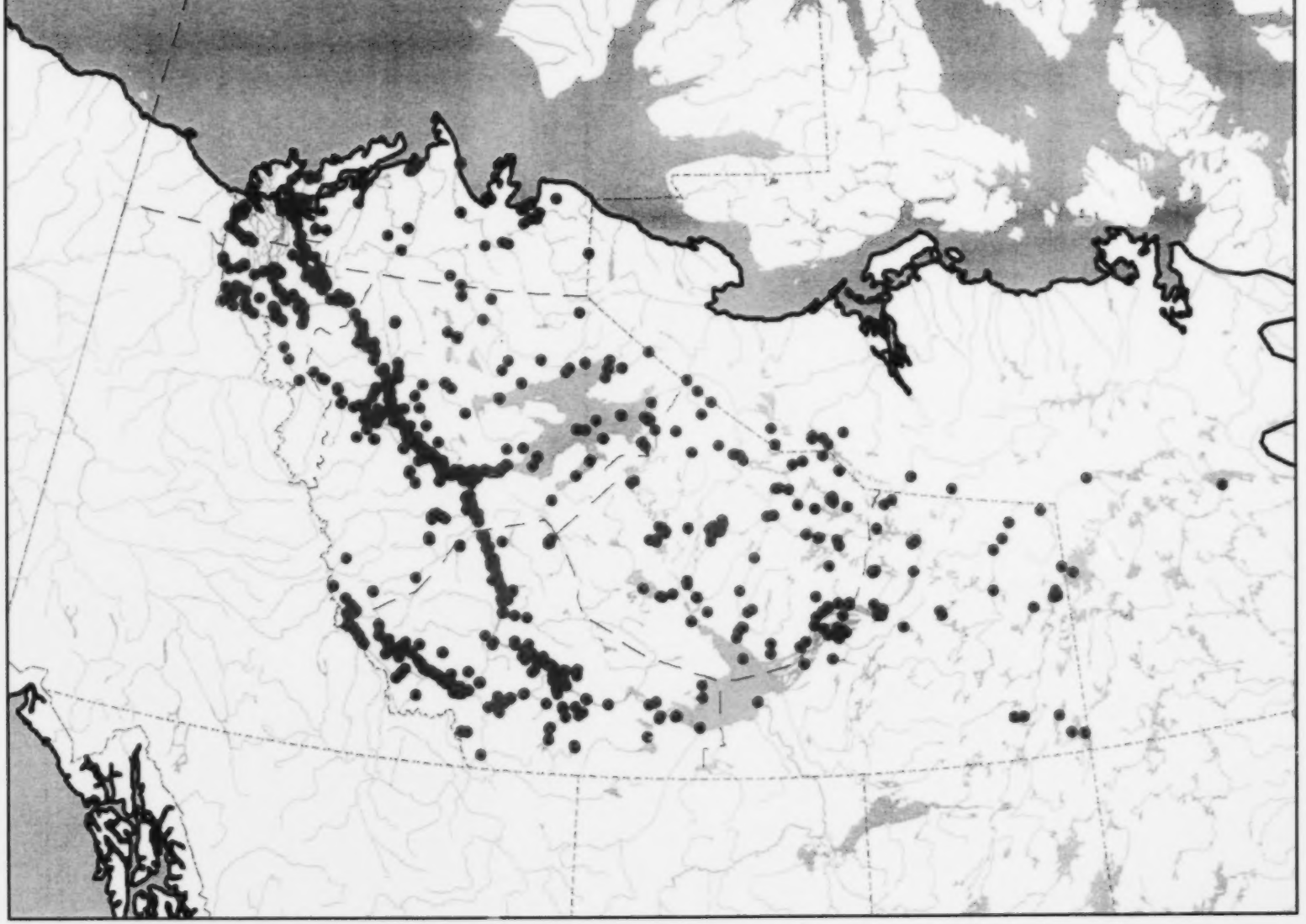

Figure 86. Revised distribution boundaries for Arctic Grayling (*Thymallus arcticus*) based on point distributions and previously published boundaries.

Family 8. Percopsidae
[Trout-Perches (E), Omiscos (F)] – 1 species.

Percopsis omiscomaycus (Walbaum 1792) [Figs. 87, 88]

Common Names: Trout-Perch (E), omisco (F).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: Widely distributed in the NT, Trout-Perch exhibit lacustrine, adfluvial, and riverine life history types (Richardson et al. 2001; Evans et al. 2002). Spawning occurs from late spring to early summer, frequently in the shallows of streams or along beaches in lakes, often at night (Richardson et al. 2001). Adfluvial and riverine populations spawn in rivers over sand and gravel substrates (Evans et al. 2002). In lakes, spawning occurs in shallow water (<1 m) over gravel and sand substrates (Richardson et al. 2001). Many males and females die after spawning (Evans et al. 2002). Their large, adhesive eggs stick to the substrate or vegetation where they incubate for 6–7 days (Richardson et al. 2001; Evans et al. 2002) at water temperatures between 20–23°C and for 10 days at lower water temperatures (Evans et al. 2002). In rivers, young and juveniles inhabit benthic areas. Once they have grown large enough, adfluvial juveniles move into lakes, where they remain until they are ready to spawn (Evans et al. 2002). Lacustrine young remain near the spawning grounds and occur near the bottom over substrates of sand, gravel, and mud at depths <10 m. Young move offshore to deeper water as summer progresses; juveniles are typically benthic (Richardson et al. 2001). Riverine populations remain in rivers after spawning and adfluvial populations return to lakes. Riverine adults inhabit deeper water during the day and shallow water at night (Evans et al. 2002). Lacustrine adults make the same diel movements and prefer substrates of sand and mud. They are often found near the bottom at depths between 7–15 m (Richardson et al. 2001).

Taxonomic Comments: None.

Distribution Comments: Trout-Perch are distributed along the Yukon River system in Alaska (Mecklenburg et al. 2002), in the Porcupine River system and perhaps extreme southeastern areas of the YT, and in the extreme southern Kivalliq area of NU adjacent to Manitoba waters (Scott and Crossman 1973; Lee et al. 1980).

Notes

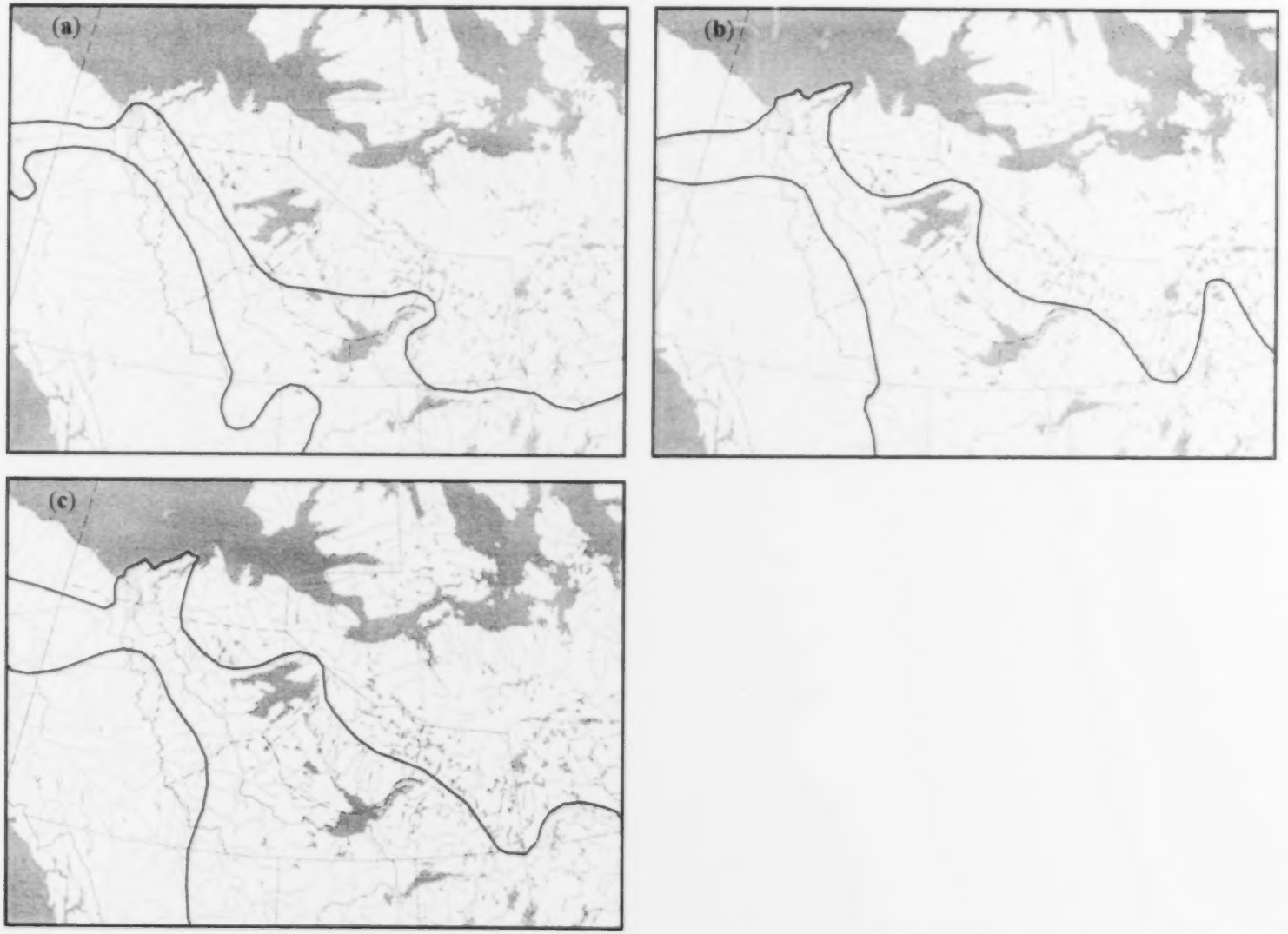

Figure 87. Previously published distributions of Trout-Perch (*Percopsis omiscomaycus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

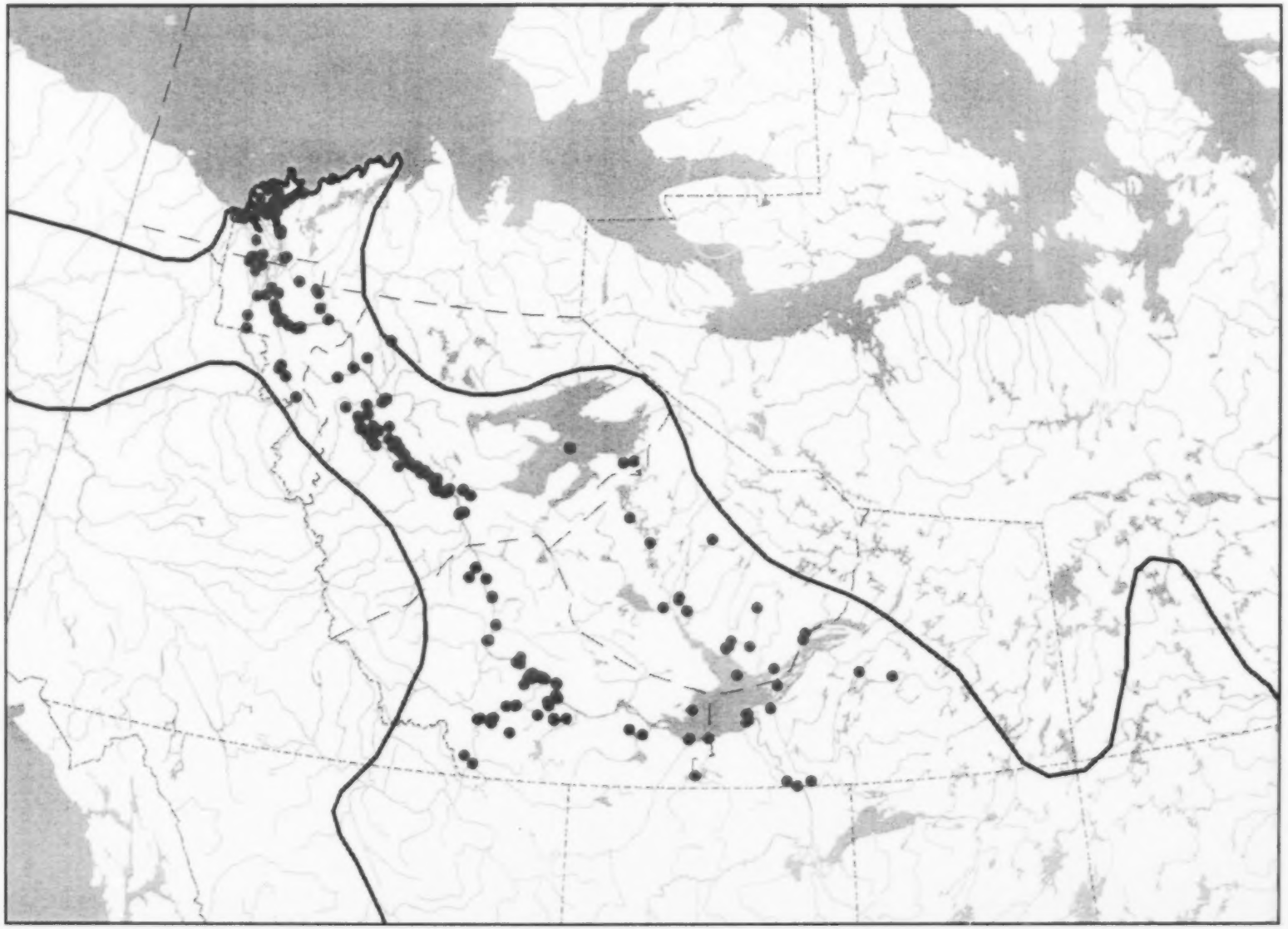

Figure 88. Revised distribution boundaries for Trout-Perch (*Percopsis omiscomaycus*) based on point distributions and previously published boundaries.

Family 9. Gadidae
[Cods (E), Morues (F)] – 1 species.

Lota lota (Linnaeus 1758) [Figs. 89, 90]

Common Names: Burbot (E), lotte (F), tiktabet (In, Tuktoyaktuk), titalik (In, Mackenzie River), titaliq (In, Mackenzie River delta) (McAllister et al. 1987), tittaaliq (Inv) (The Community of Aklavik et al. 2000), cheluk (GW) (Gwich'in Renewable Resource Board 1997; VanGerwen-Toyne 2002), nôkw£ (NS), nôhfœ (NS) (Bayha and Snortland 2004), nǫhkwèe (DR) (Dogrib Divisional Board of Education 1996), loche (E, local name) (Dogrib Divisional Board of Education 1996; Gwich'in Renewable Resource Board 1997; The Community of Aklavik et al. 2000; VanGerwen-Toyne 2002; Bayha and Snortland 2004), lingcod (E, local name) (Bayha and Snortland 2004).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: Widely distributed in the NT, Burbot are generally found in deep lakes but may occur in rivers, small streams, and low lying ponds. Lacustrine, riverine, and adfluvial life history types are found in the NT and this species may also be found in brackish waters. Habitat requirements for all life history types are similar. Spawning occurs at night under the ice between January and April depending on water temperature (0.6—1.7°C). Eggs are broadcast over sand, gravel, or rubble substrates at depths between 0.5—3 m, or deeper. Eggs settle in the interstices of the substrate and incubate for up to three months depending on water temperature (Richardson et al. 2001; Evans et al. 2002). After spawning, riverine females move downstream to the lower reaches of the river. The males follow a few days later (Evans et al. 2002). Sac fry are pelagic and occur over sand and rubble substrates. Once they reach the fingerling stage they become nocturnal benthic littoral feeders. Boulders, cobble, logs, and submergent vegetation are used for cover during the day. Juveniles occur along rocky shorelines over rock and gravel substrates (Richardson et al. 2001; Evans et al. 2002). Lacustrine juveniles and adults make seasonal movements to offshore deeper waters in the hypolimnion in early summer. Some adults make diel movements in summer into shallower water at night to feed (Richardson et al. 2001). Riverine populations prefer moderate to high turbidity, low water velocities (<0.46 m/s), and shallow depths (<0.76 m) (Evans et al. 2002). Adults remain nocturnal and prefer the same substrates as juveniles (Richardson et al. 2001; Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: Burbot are present throughout Alaska (Mecklenburg et al. 2002), the YT, and are widespread throughout the mainland Kitikmeot and Kivalliq areas of NU (Scott and Crossman 1973; Lee et al. 1980). The distribution in northeastern NU was modified based on MacDonald and Stewart (1980) and Stewart and Bernier (1983). The area near Adelaide Peninsula is considered uncertain (D.B. Stewart pers. comm. 2007).

Notes

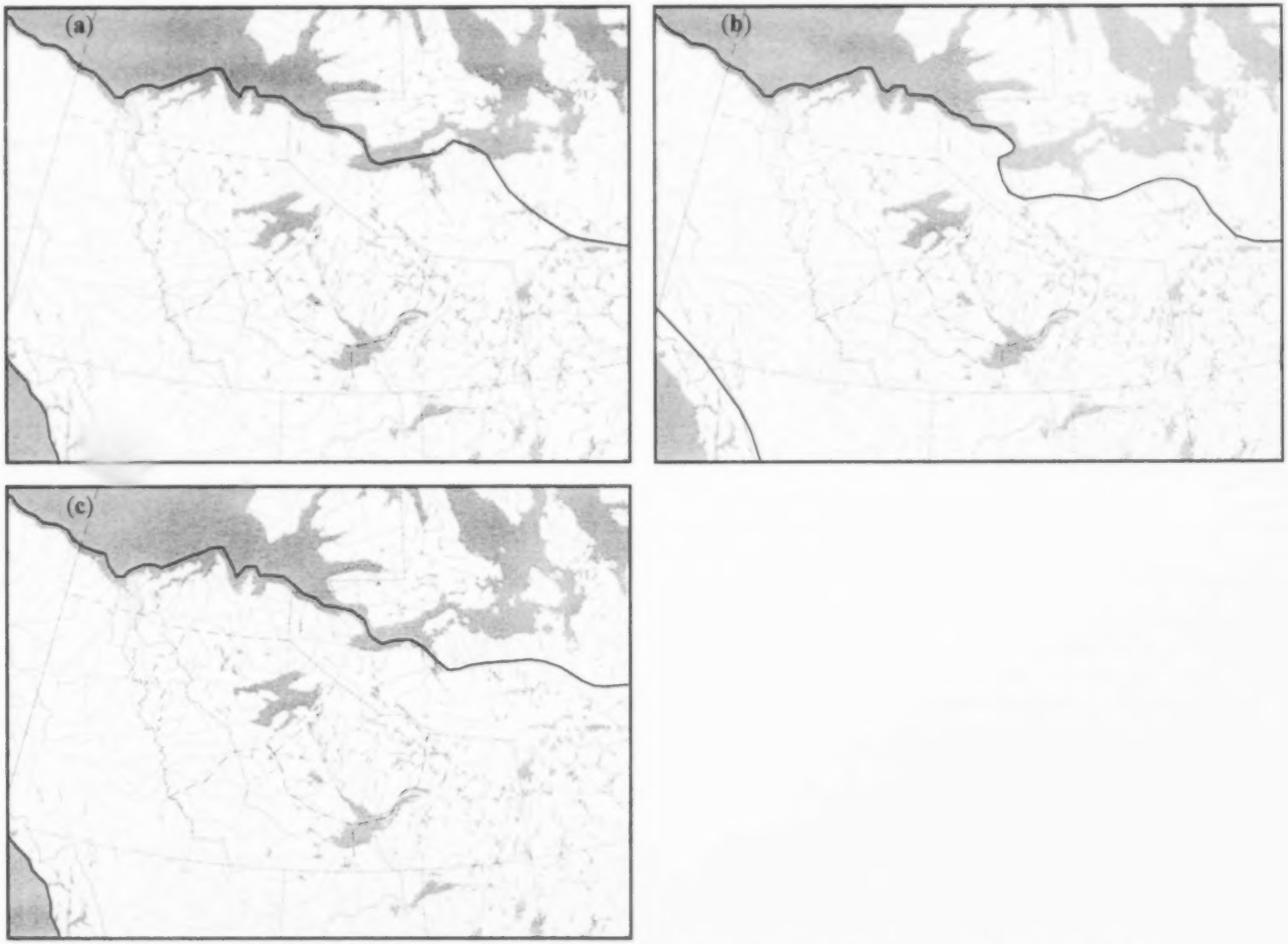

Figure 89. Previously published distributions of Burbot (*Lota lota*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

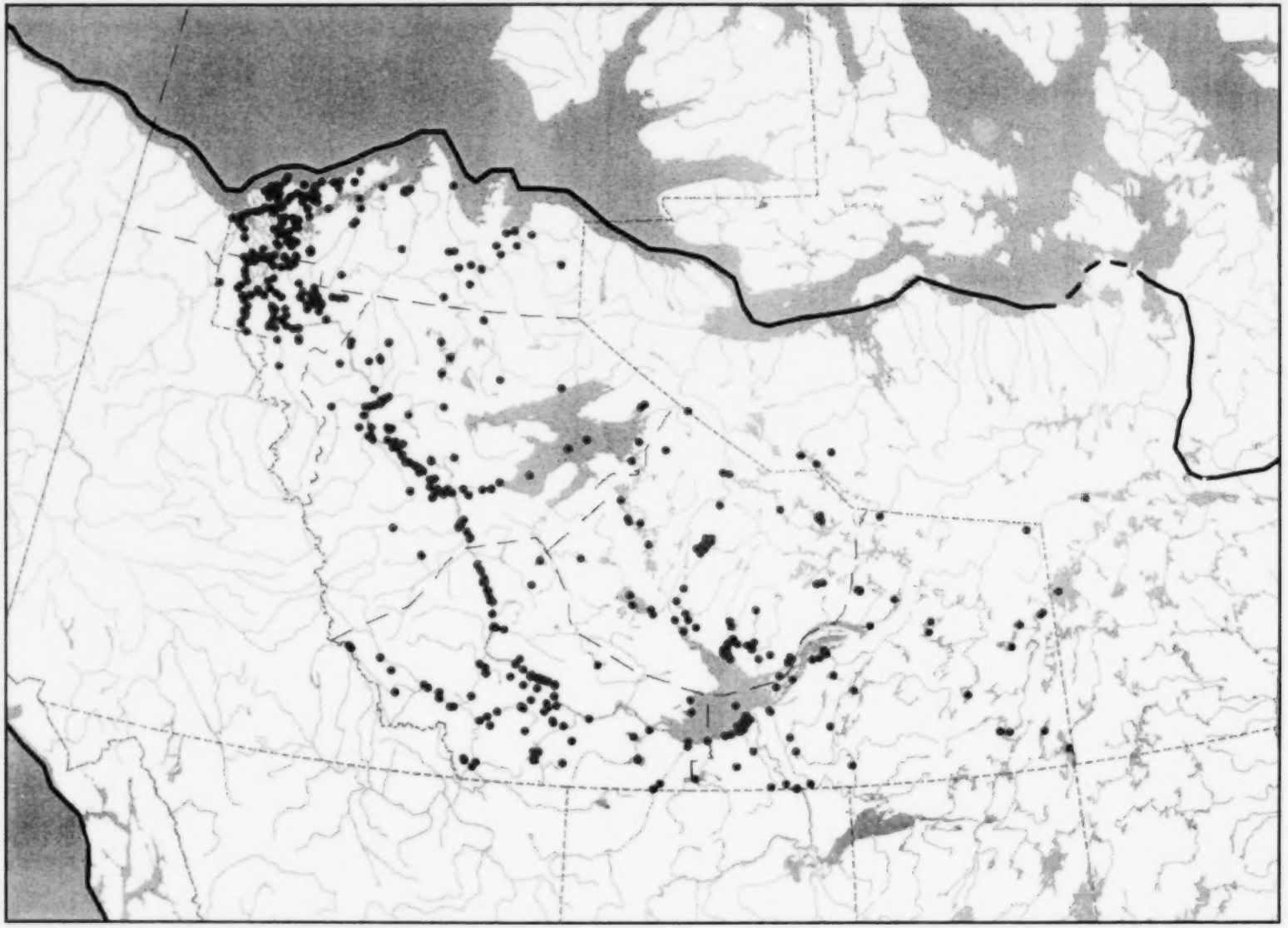

Figure 90. Revised distribution boundaries for Burbot (*Lota lota*) based on point distributions and previously published boundaries.

Family 10. Gasterosteidae
[Sticklebacks (E), Épinoches (F)] – 3 species.

Culaea inconstans (Kirtland 1840) [Figs. 91, 92]

Common Names: Brook Stickleback (E), épinoche à cinq épines (F).

Conservation Status: Regional: Sensitive (Working Group on General Status of NWT Species 2006).

Habitat: Distributed in the vicinity of Hay River north to the mouth of the Arctic Red River, Brook Stickleback exhibit lacustrine and riverine life history types. Spawning occurs in spring and habitat requirements are similar for both life history types. The male constructs a nest of vegetation, sticks and debris on reeds or grass in shallow water (<0.4 m) close to the bottom (Richardson et al. 2001; Evans et al. 2002). Surrounding substrate typically consists of organic debris and sand (Evans et al. 2002). Females are courted into the nest where they deposit their eggs. The female then leaves and the male cares for the eggs and subsequent fry until they are free swimming (Richardson et al. 2001; Evans et al. 2002). Successful spawning requires water temperatures between 15—19°C, vegetation for nest construction, and clear water for courtship displays (Evans et al. 2002). Lacustrine young occur in shallow water in association with vegetation. Adults, also found near vegetation, occur in shallow water during the spring and move to deeper water for the winter (Richardson et al. 2001). No information was available on riverine juvenile habitat requirements. After spawning, riverine adults return downstream to deeper, cooler water for the remainder of the summer. They are commonly found in association with dense aquatic vegetation over substrates of sand, gravel, silt, and mud in water up to 1.5 m deep. They also occasionally occur over rubble, boulder, clay, detritus, and bedrock substrates (Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: The Brook Stickleback is not present in Alaska, the YT, or NU. The NT distribution area was extended west to include the Birch River (Dryden et al. 1973) and east to include Great Slave Lake (University of Alberta Museum of Zoology 2005).

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Figure 91. Previously published distributions of Brook Stickleback (*Culaea inconstans*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

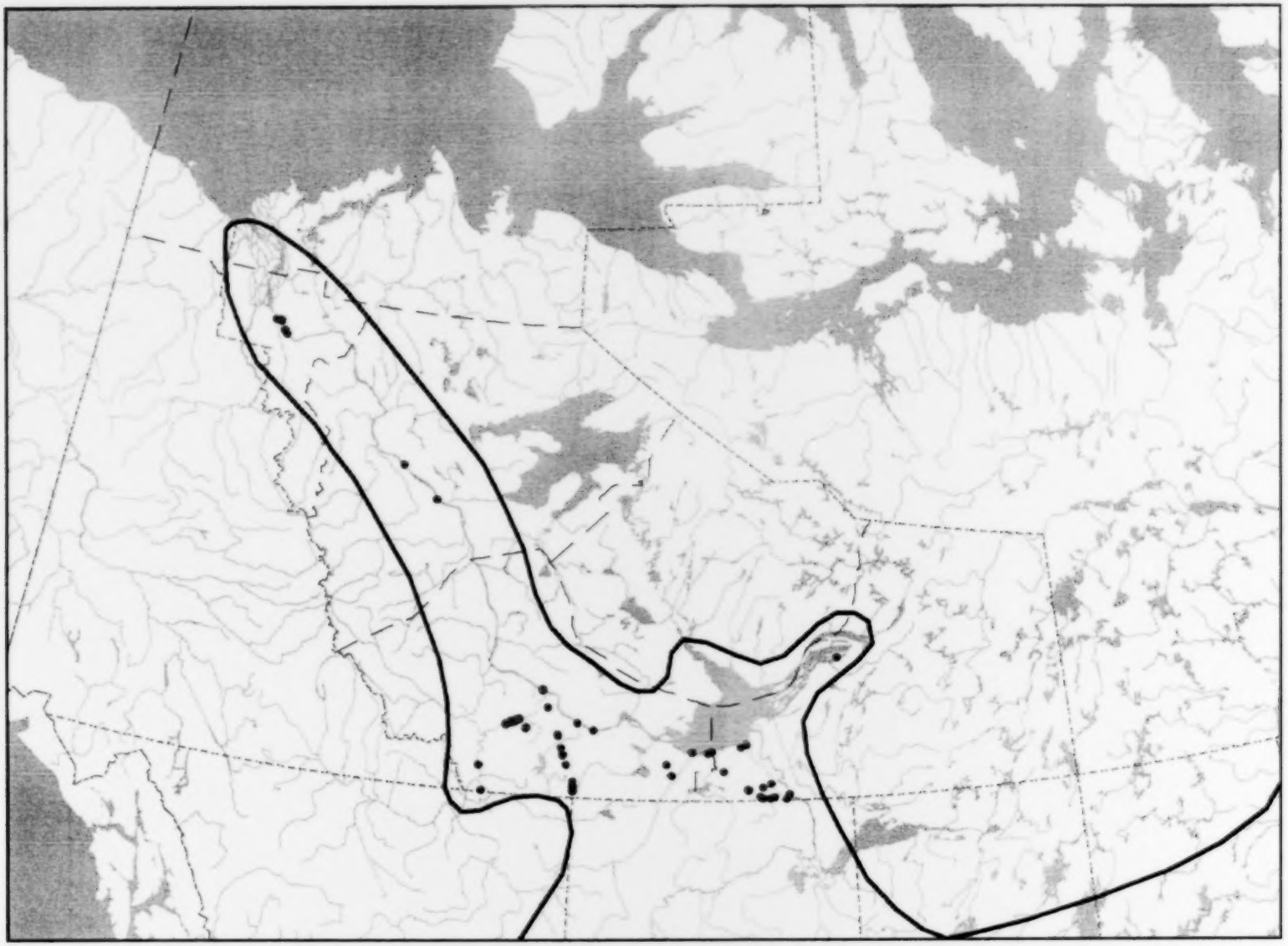

Figure 92. Revised distribution boundaries for Brook Stickleback (*Culaea inconstans*) based on point distributions and previously published boundaries.

Gasterosteus aculeatus Linnaeus 1758 [Figs. 93, 94]

Common Names: Threespine Stickleback (E), épinoche à trois épines (F).

Conservation Status: Regional: Vagrant (Working Group on General Status of NWT Species 2006).

Habitat: In the NT, the Threespine Stickleback is known only from the Kugmallit Bay region. This species exhibits lacustrine, riverine, and anadromous life history types. A marine form also exists, and all forms are considered to belong to a diverse species complex (see taxonomic comments below). In Alaska, spawning occurs between May and July ideally over a sandy substrate in shallow water. Anadromous populations enter fresh water in late spring (June) to spawn (McPhail and Lindsey 1970). The male constructs a nest of small twigs and plant debris held together by a kidney secretion (Scott and Crossman 1973). The nest is often built near aquatic vegetation. One or more females deposit their eggs in the nest. Once full, the male loosens the top of the nest, likely for improved ventilation. The male guards and fans the eggs, and cares for the young until they are free-swimming (McPhail and Lindsey 1970). Lacustrine fry then move into densely vegetated areas to feed. Once they reach a length of 1.5—2.5 cm they move into open water in large schools, where they remain until returning to the littoral zone to reproduce the following spring (Foster et al. 1988).

Taxonomic Comments: Regarded as a species complex (Nelson et al. 2004) with a high level of diversity among freshwater forms in particular, likely due to repeated colonization of fresh water habitats by the marine form (McKinnon and Rundle 2002).

Distribution Comments: Threespine Sticklebacks are distributed along the western and southern coasts of Alaska, and have been reported as vagrants on the North Slope (Mecklenburg et al. 2002). They occur in the extreme southwestern YT (Scott and Crossman 1973). They are present along the coast of southeastern NU and have been recorded from the Belcher Islands and the southern portion of Baffin Island (Scott and Crossman 1973; Lee et al. 1980). We consider this species to be a vagrant in the NT. Its distribution was extended to include the Kugmallit Bay region of the NT (Byers and Kashino 1980). A record indicating an occurrence in Little Doctor Lake, NT (Stephansson 1973) was deemed to be invalid. The distribution in southern NU and northern Manitoba was modified based on MacDonald and Fudge (1979) and Stewart and Watkinson (2004).

Notes

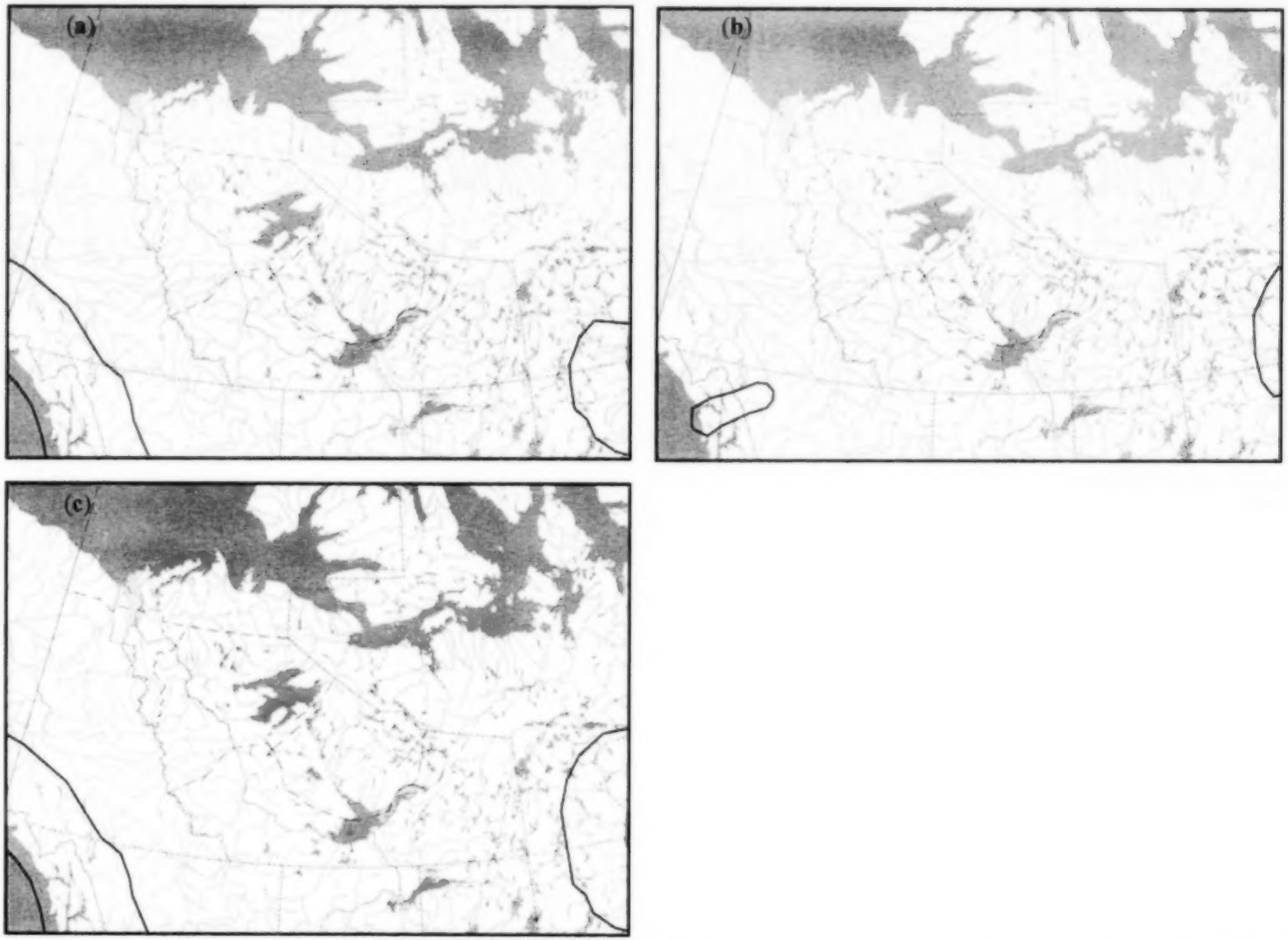

Figure 93. Previously published distributions of Threespine Stickleback (*Gasterosteus aculeatus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

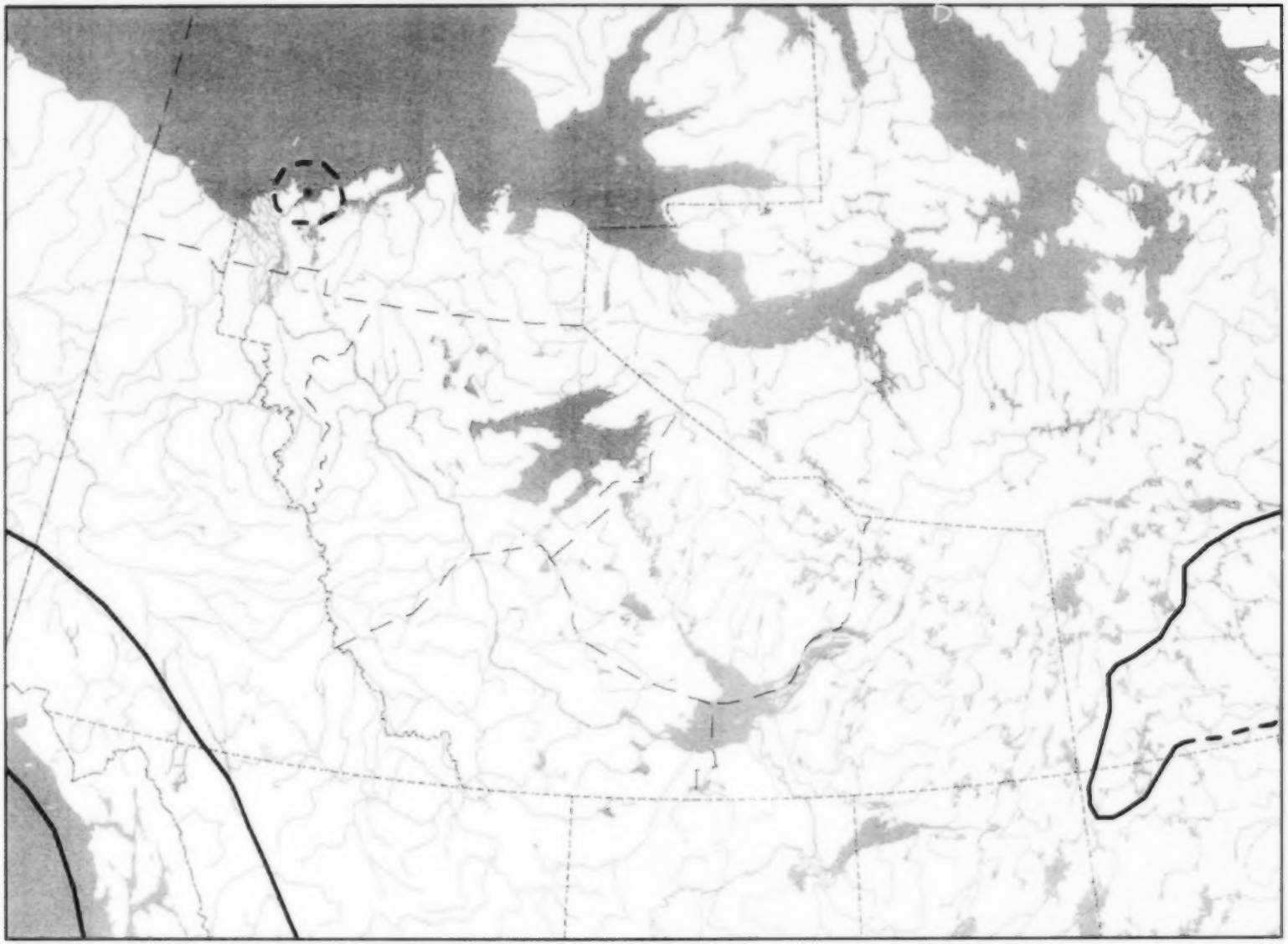

Figure 94. Revised distribution boundaries for Threespine Stickleback (*Gasterosteus aculeatus*) based on point distributions and previously published boundaries.

Pungitius pungitius (Linnaeus 1758) [Figs. 95, 96]

Common Names: Ninespine Stickleback (E), épinoche à neuf épines (F).

Conservation Status: Regional: Secure (Working Group on General Status of NWT Species 2006).

Habitat: The Ninespine Stickleback is distributed throughout the Mackenzie River system and delta. This species exhibits lacustrine, riverine, and anadromous life history types. Spawning occurs from May to late July and habitat requirements are similar for all life history types. Males construct nests in shallow water 0.02—0.2 m off the substrate amongst weeds in densely vegetated areas. Nests are made of aquatic vegetation and debris held together by a secretion from the kidney. Females are enticed into the nest to deposit their eggs. The male fertilizes the eggs and guards the nest and subsequent fry until they are free swimming (Richardson et al. 2001; Evans et al. 2002). Lacustrine young move into vegetated, shallow waters for the remainder of the summer, moving to deeper waters in fall to overwinter (Richardson et al. 2001). Riverine young move into shallow sandy areas, while anadromous young move into brackish waters (Evans et al. 2002). Lacustrine adults are tolerant of low oxygen tensions and are frequently found in densely vegetated areas. They also occur in open waters with little vegetation over sand and gravel substrates (Richardson et al. 2001). Riverine adults are typically found at depths of 0.5—2.5 m in areas with current speeds <0.30 m/s over substrates of mud and sand (Evans et al. 2002).

Taxonomic Comments: Haglund et al. (1992, cited in Nelson et al. 2004) proposed that the North American Ninespine Stickleback be recognized as *P. occidentalis* (Cuvier 1829) based on a study of allozymal variation. A broader molecular study should be completed before this name is accepted (Nelson et al. 2004). Keivany and Nelson (2000, cited in Nelson et al. 2004) propose recognizing the North American form as *P. p. occidentalis* based on morphology. As this is unresolved, traditional nomenclature is followed herein.

Distribution Comments: Ninespine Stickleback are widespread throughout much of Alaska (Mecklenburg et al. 2002), occur along the YT North Slope and possibly in some northern inland drainages, and are widespread in the Kitikmeot and Kivalliq areas of NU (Scott and Crossman 1973; Lee et al. 1980). The distribution on Victoria Island was modified based on Stewart and Bernier (1983).

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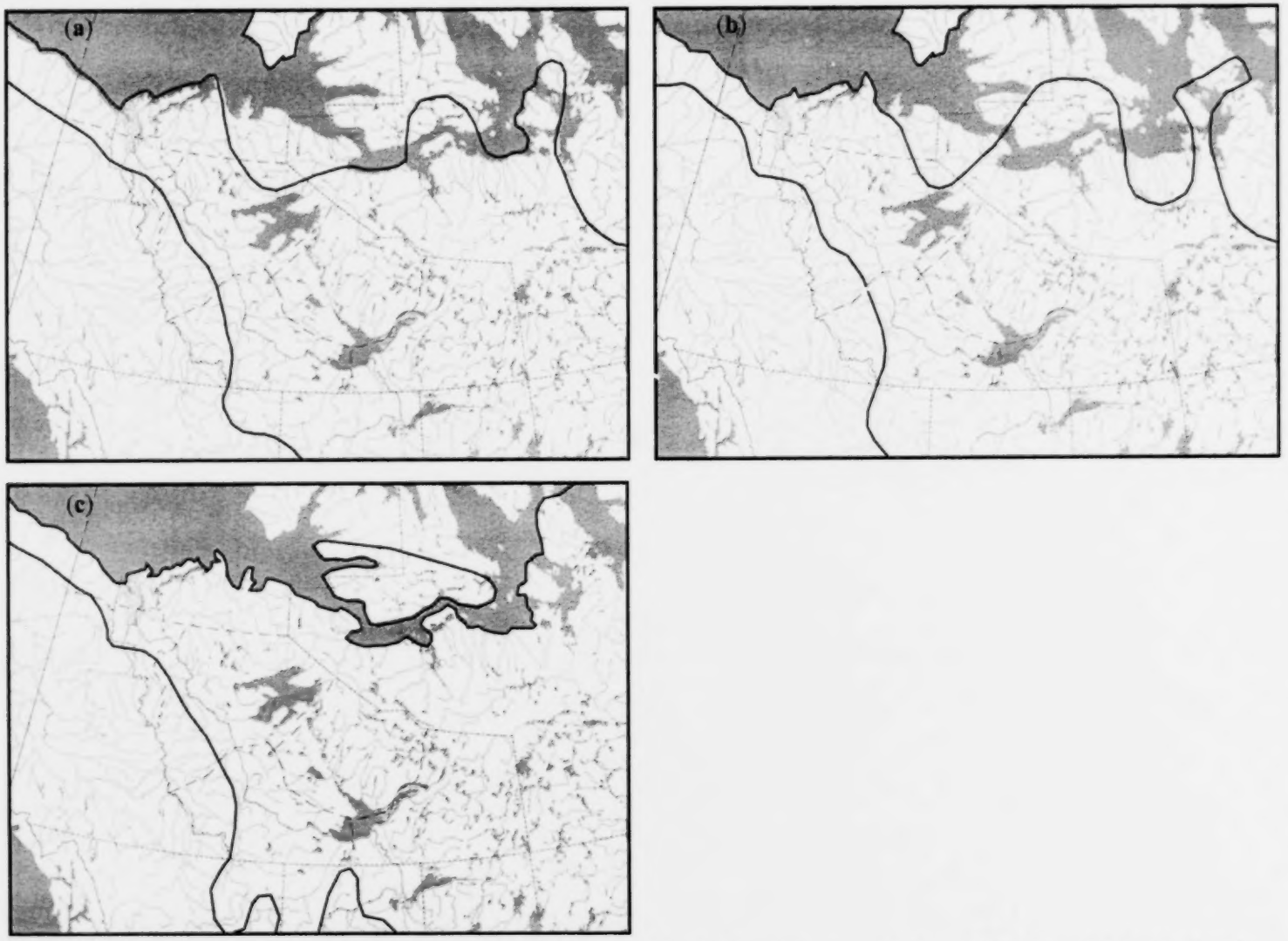

Figure 95. Previously published distributions of Ninespine Stickleback (*Pungitius pungitius*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

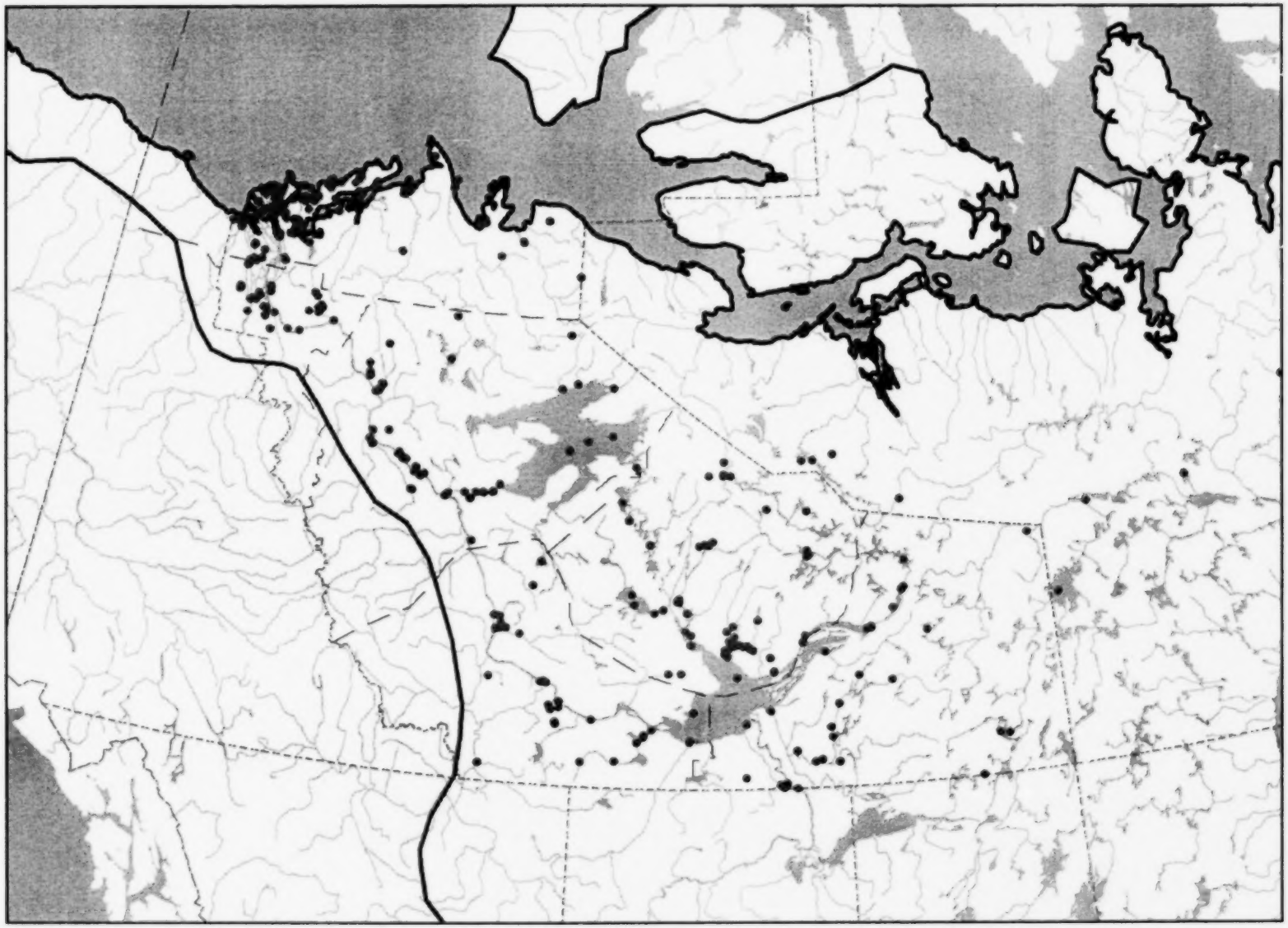

Figure 96. Revised distribution boundaries for Ninespine Stickleback (*Pungitius pungitius*) based on point distributions and previously published boundaries.

Family 11. Cottidae
[Sculpins (E), Chabots (F)] – 3 species.

Cottus cognatus Richardson 1836 [Figs. 97, 98]

Common Names: Slimy Sculpin (E), chabot visqueux (F).

Conservation Status: Regional: Undetermined (Canadian Endangered Species Conservation Council 2000; Working Group on General Status of NWT Species 2006); National: Secure (Canadian Endangered Species Conservation Council 2000).

Habitat: Widely distributed in the NT, the Slimy Sculpin exhibits lacustrine and riverine life history types. This species occurs in rivers, streams, creeks and, less often, lakes. Spawning occurs in late May and early June in both lakes and rivers (Richardson et al. 2001; Evans et al. 2002). Lacustrine spawning takes place in shallow water over substrates of sand, gravel, and rock (Richardson et al. 2001). Males choose a spawning site under a rock, ledge, or submerged tree root in a lake or river. A female, who has been courted by the male, enters the nest and lays a clutch of adhesive eggs on the ceiling. The male fertilizes and guards these eggs while the female leaves or is driven out (Richardson et al. 2001; Evans et al. 2002). Lacustrine fry are typically found in shallow water (0.5—1.5 m) over gravel and sand substrates. A shift to deepwater habitat occurs as they mature (Richardson et al. 2001). A suspected spawning and known nursery area in the NT is at the mouth of St. Charles Creek (Stein et al. 1973b). Riverine fry have been found over cobble and boulder substrates at depths of 0.05—0.25 m and water velocities <0.2 m/s. Juveniles have been recorded over the same substrates in deeper water (0.1—0.3 m) at velocities of 0.05—0.4 m/s (Evans et al. 2002). Lacustrine adults are found at depths ranging from 0.5—210 m over gravel and rock or soft substrates. In the NT, adults were found in waters <10 m deep with a current (Richardson et al. 2001). Northern riverine adults prefer clear streams with gravel substrates (Evans et al. 2002).

Taxonomic Comments: Although easily distinguishable using taxonomic keys, many workers appear to assume that all shallow-water sculpins in northern fresh waters represent this species. Appropriate care in field identification is required.

Distribution Comments: Slimy Sculpin are widespread throughout Alaska (Mecklenburg et al. 2002), the YT, and the Kitikmeot and Kivalliq areas of NU (Scott and Crossman 1973; Lee et al. 1980). The distribution in northeastern NU was modified based on MacDonald and Stewart (1980). The area near Adelaide Peninsula is considered uncertain (D.B. Stewart pers. comm. 2007).

Notes

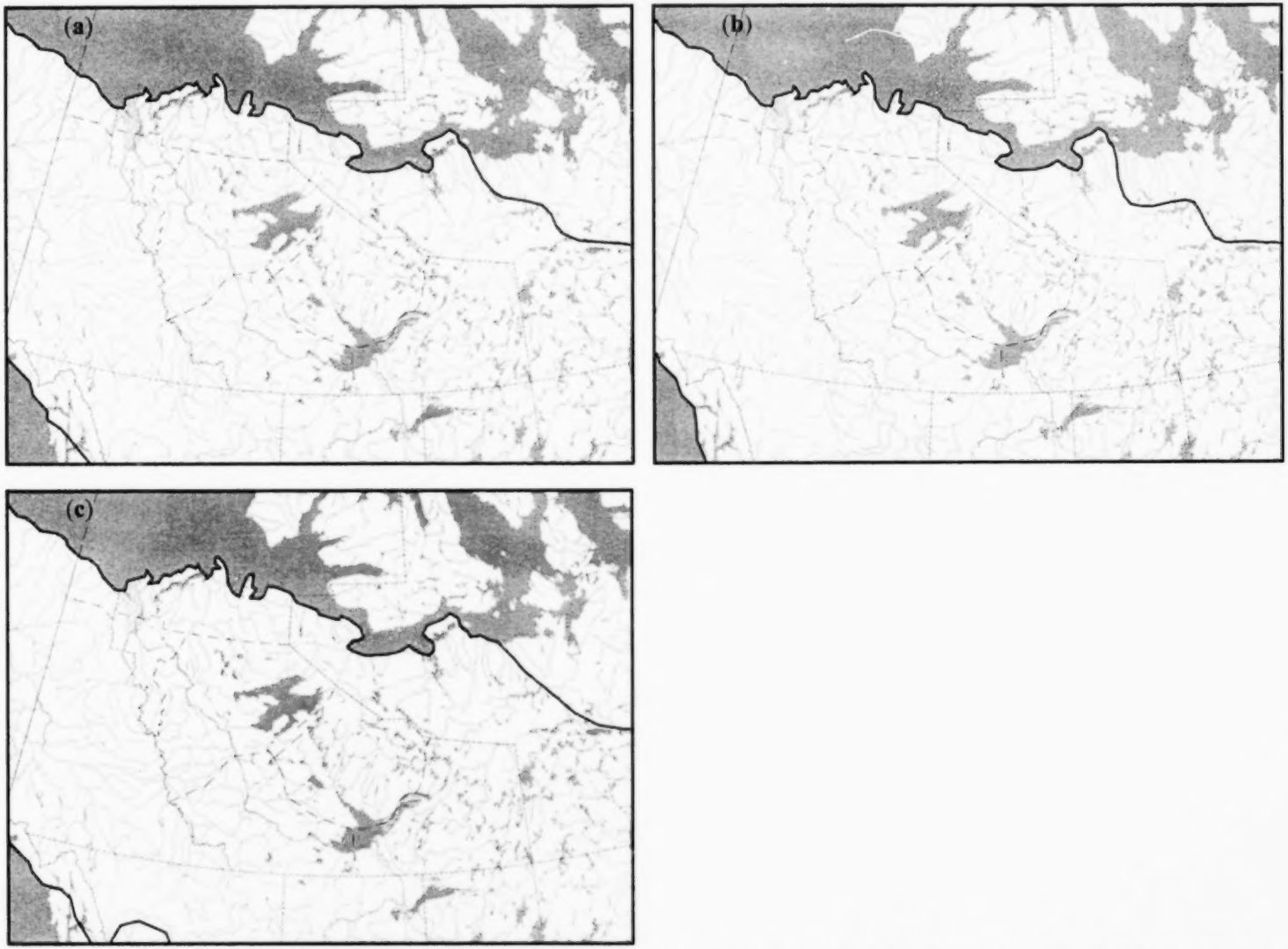

Figure 97. Previously published distributions of Slimy Sculpin (*Cottus cognatus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

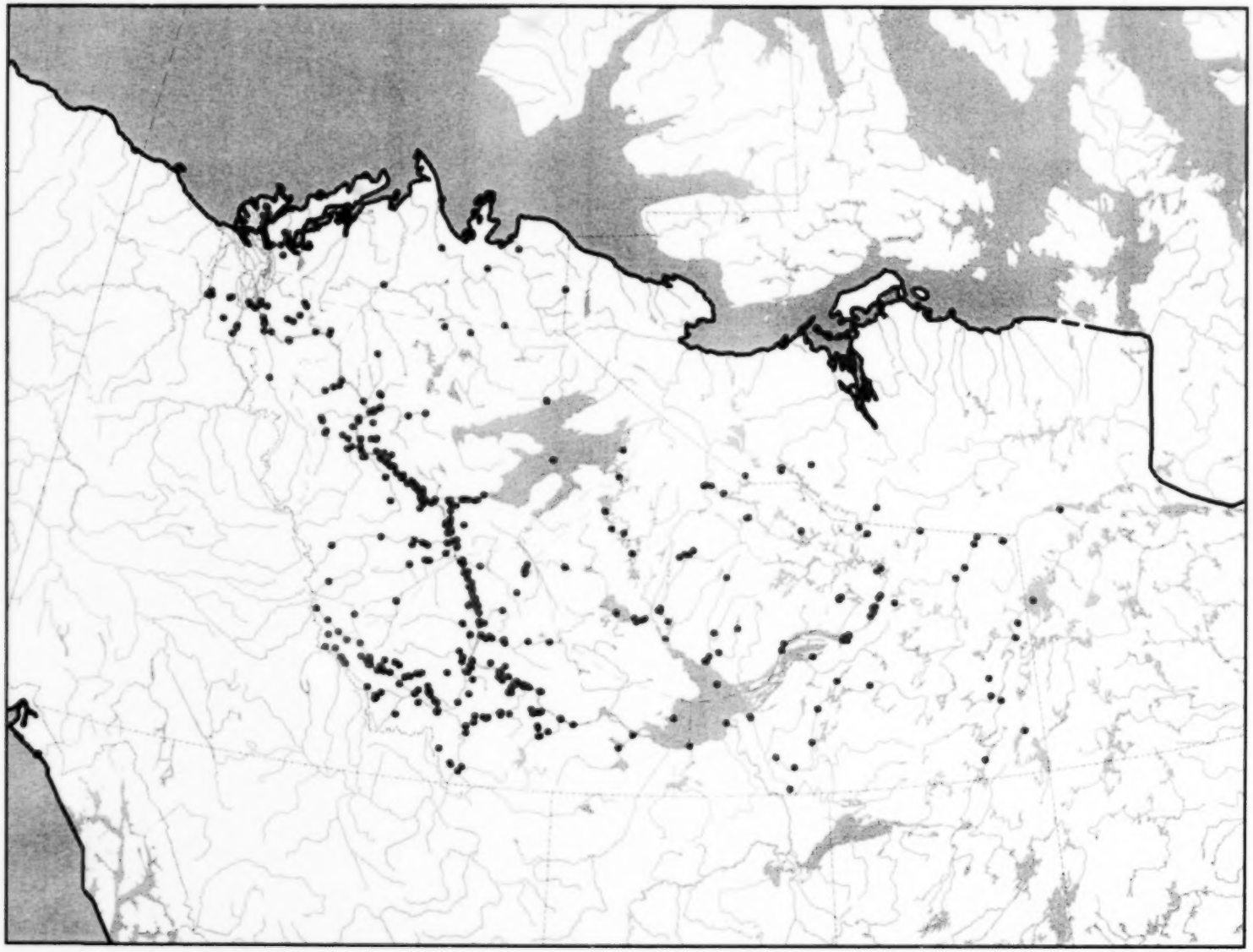

Figure 98. Revised distribution boundaries for Slimy Sculpin (*Cottus cognatus*) based on point distributions and previously published boundaries.

Cottus ricei (Nelson 1876) [Figs. 99, 100]

Common Names: Spoonhead Sculpin (E), chabot à tête plate (F).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006), Not at risk (Assessed: 1989) (COSEWIC 2006).

Habitat: Distributed throughout the Mackenzie River system, the Spoonhead Sculpin exhibits lacustrine and riverine life history types. This species occurs in shallow areas of large muddy rivers, small fast flowing rivers and streams, and in deep areas of lakes. Spawning takes place in spring, summer, or early fall (Richardson et al. 2001; Evans et al. 2002). In lakes, eggs are released under stones or logs, generally over rubble, boulder, gravel, or mud and sand substrates in water up to 82 m deep. Young are typically found amongst rocks in the hypolimnion at depths between 12—20 m (Richardson et al. 2001). Little is known of riverine spawning habitat, but a suspected spawning and known nursery area in the NT is St. Charles Creek (Stein et al. 1973b). Young are generally found in shallow areas of turbid rivers (Evans et al. 2002). Lacustrine adults occur at depths ranging from 5—210 m, but are most common in the 50—90 m depth range (Richardson et al. 2001). Riverine adults prefer large turbid rivers and are generally found at greater depths than juveniles (Evans et al. 2002).

Taxonomic Comments: See comments for Slimy Sculpin.

Distribution Comments: Not present in Alaska, Spoonhead Sculpin are found in some northern YT waters, and are present in the extreme southwestern Kivalliq area of NU (Scott and Crossman 1973; Lee et al. 1980).

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Figure 99. Previously published distributions of Spoonhead Sculpin (*Cottus ricei*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

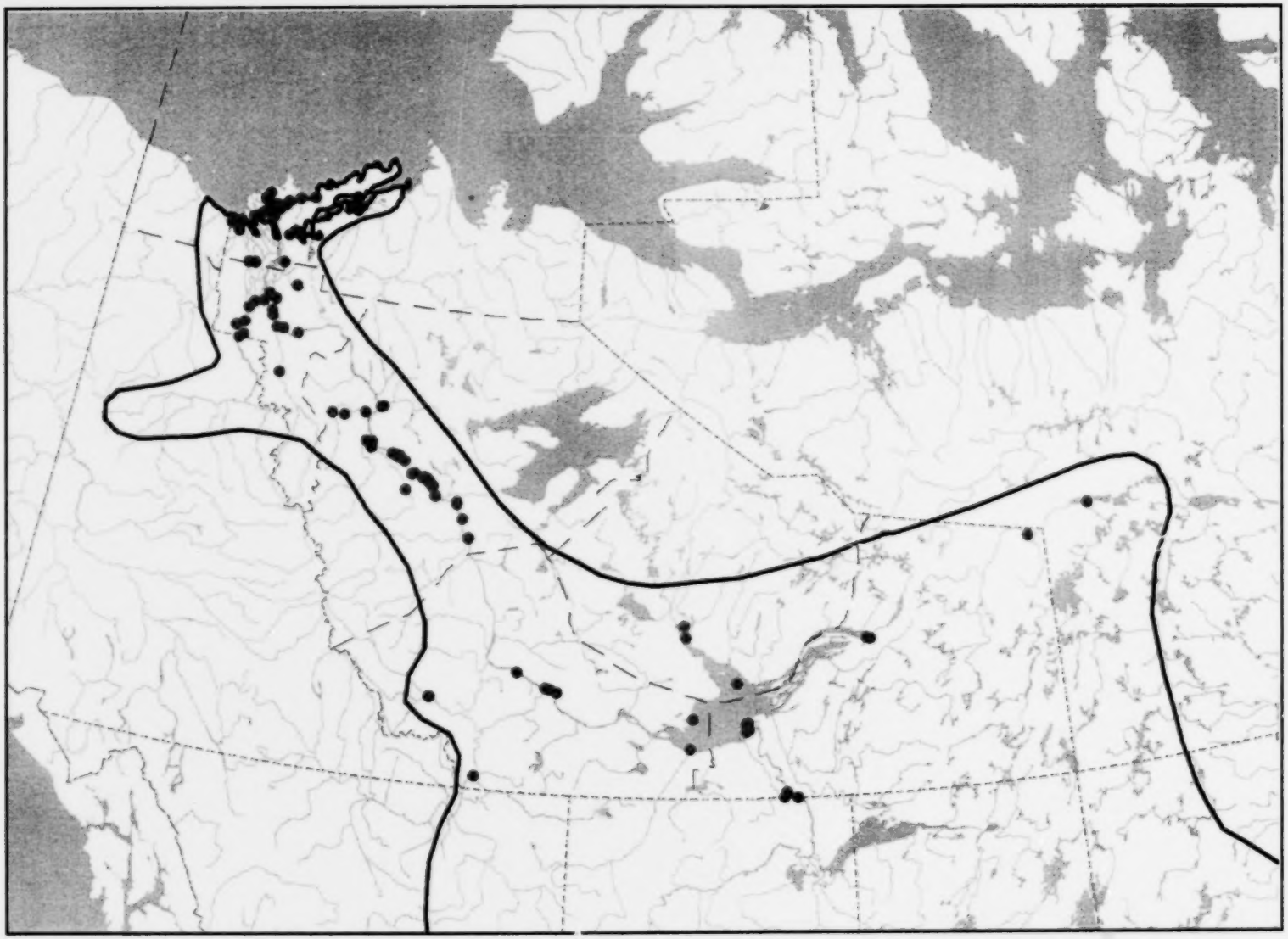

Figure 100. Revised distribution boundaries for Spoonhead Sculpin (*Cottus ricei*) based on point distributions and previously published boundaries.

Myoxocephalus thompsonii (Girard 1851) [Figs. 101, 102]

Common Names: Deepwater Sculpin (E), chabot de profondeur (F), kanayuq (Inv) (The Community of Aklavik et al. 2000).

Conservation Status: Regional: Sensitive (Working Group on General Status of NWT Species 2006), Not at risk (Assessed: 2006) (COSEWIC 2006); National: Secure (Canadian Endangered Species Conservation Council 2006).

Habitat: Occurring in La Martre, Great Slave, Keller, Prosperous and Great Bear lakes, and a disjunct area around Tuktoyaktuk Peninsula in the NT, the Deepwater Sculpin primarily exhibits a lacustrine life history type and is generally found in deep lakes. Spawning likely occurs from late fall to winter, although it may occur year round. Spawning may take place at depths >70 m in offshore areas. Eggs are deposited beneath objects on rock or gravel substrates (Richardson et al. 2001). Young occur at the surface or in midwater areas of lakes and remain pelagic until they reach a total length of approximately 3 cm (Geffen and Nash 1992), at which time they move to the lake bottom over a rock and boulder substrate at depths >50 m. Adults are demersal and occur at depths >70 m often over mud substrates (Richardson et al. 2001).

Taxonomic Comments: Some authors recognize *M. thompsonii* as a subspecies of *M. quadricornis* (Fourhorn Sculpin) (Nelson et al. 2004). The latter exists as wholly marine, brackish, and freshwater forms which differ in horn morphology (shortened or absent in freshwater). Thus, wholly freshwater forms of *M. quadricornis* and *M. thompsonii* may be confused in some literature. Appropriate collection of voucher specimens and verification of identity is required for this species.

Distribution Comments: Occurrence is likely wider than indicated where suitable habitat (*i.e.*, deep lakes) exists. Deepwater Sculpin are not present in Alaska or the YT (although the above caveat may apply), but are present in a few isolated locations in NU (Scott and Crossman 1973). Verification of occurrences near the Tuktoyaktuk Peninsula is required.

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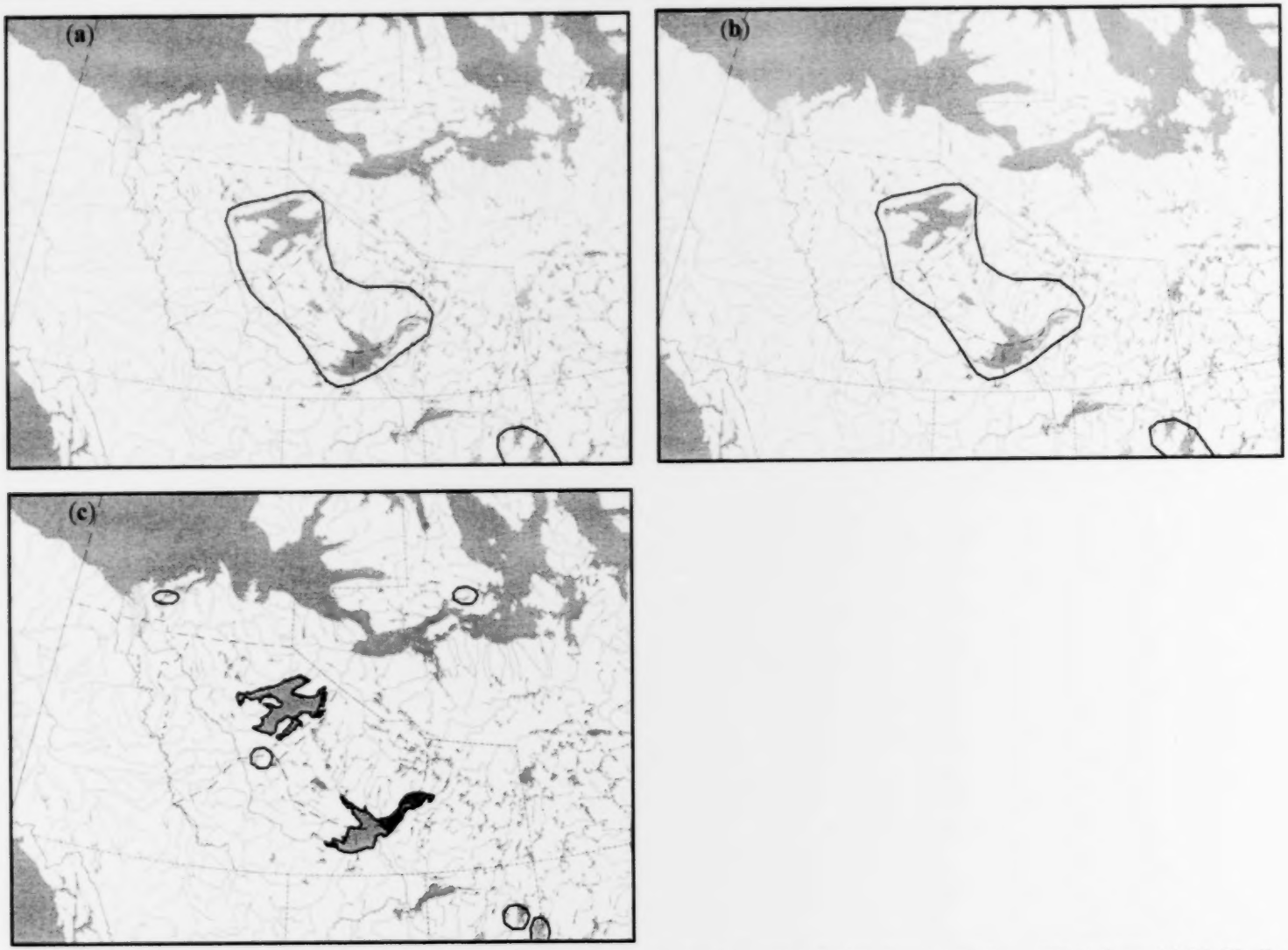

Figure 101. Previously published distributions of Deepwater Sculpin (*Myoxocephalus thompsonii*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

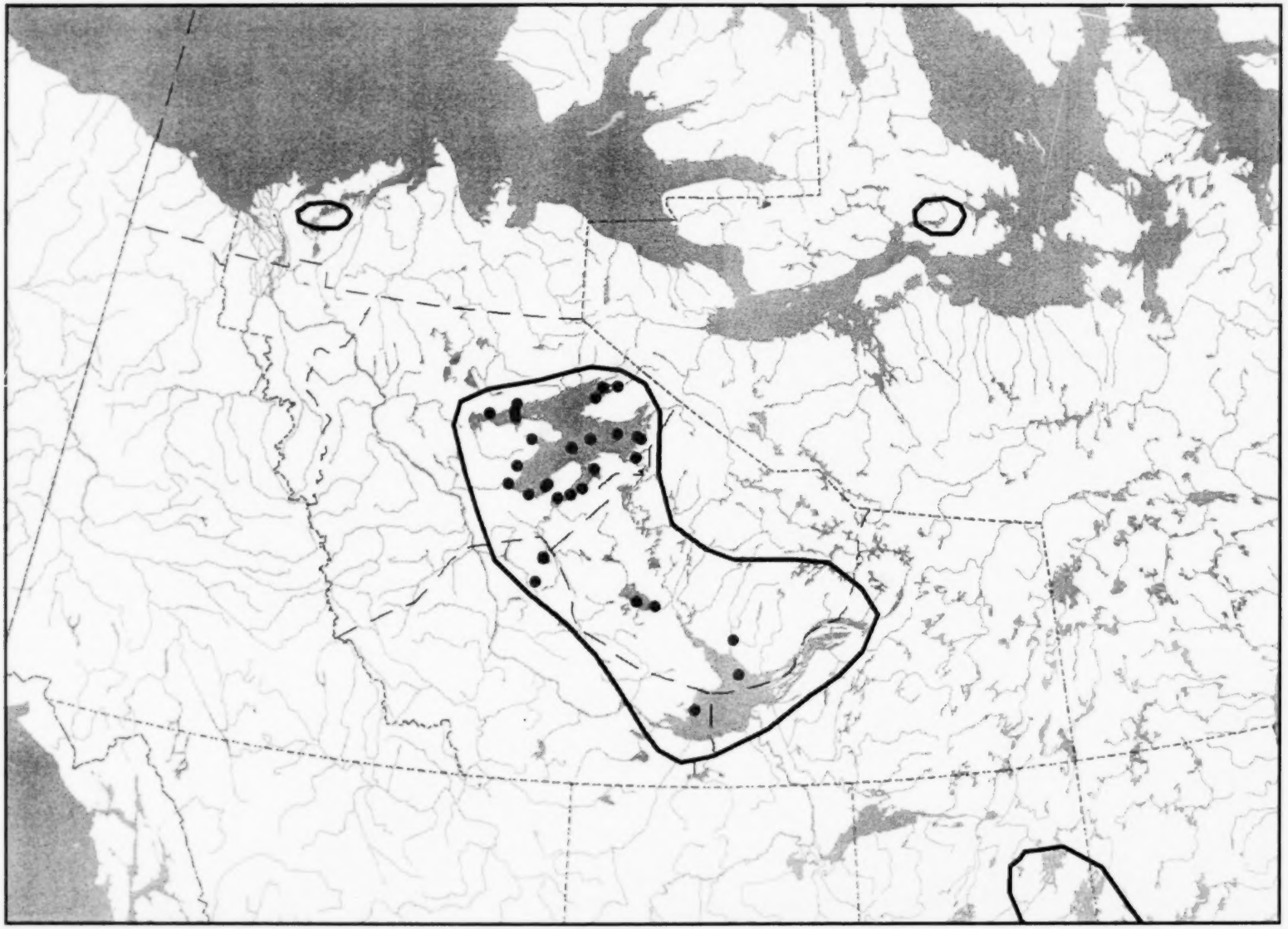

Figure 102. Revised distribution boundaries for Deepwater Sculpin (*Myoxocephalus thompsonii*) based on point distributions and previously published boundaries.

Family 12. Percidae
[Perches (E), Perches et dards (F)] – 3 species.

Etheostoma exile (Girard 1859) [Figs. 103, 104]

Common Names: Iowa Darter (E), dard à ventre jaune (F).

Conservation Status: Regional: Presence expected (Working Group on General Status of NWT Species 2006).

Habitat: There are no confirmed records of the Iowa Darter in the NT, but it has been included here as it likely occurs in the extreme south central area. This species exhibits lacustrine and riverine life history types and is generally found in lakes, rivers, bog ponds, and fast flowing streams. Spawning occurs between April and May, but may occur later in northern areas (Richardson et al. 2001; Evans et al. 2002). The Iowa Darter spawns along stream banks in shallow water with a current of 0.3—0.6 m/s (Evans et al. 2002) or along the shores of lakes in water 0.1—0.4 m deep (Richardson et al. 2001) among submerged fibrous roots and vegetation (Richardson et al. 2001; Evans et al. 2002). After spawning, adults return to deeper water. Larvae have been found in shallow areas of bays close to lake shores in water 0.5 m deep over sand and gravel substrates. In lakes and marshes, young typically occur in vegetated, sheltered, shallow areas over substrates of sand, silt, and mud. Lacustrine adults inhabit vegetated areas, often near fallen trees, at depths of 0.5—1.5 m over substrates of sand and boulders (Richardson et al. 2001). In streams, adults are typically found at depths <1.5 m in clear to mildly turbid water over sand, gravel, mud, and silt substrates in association with submerged vegetation, filamentous algae, and rooted aquatic vegetation (Evans et al. 2002). Adults are active during the day, hiding in rock crevices and underneath submerged tree roots at night (Richardson et al. 2001; Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: The Iowa Darter does not occur in Alaska, the YT, or NU. Their occurrence in immediately adjacent waters of the Slave River drainage of AB indicates the likelihood that this species is native to NT waters and not recorded simply due to a lack of sampling effort.

Notes

Figure 103. Previously published distributions of Iowa Darter (*Etheostoma exile*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

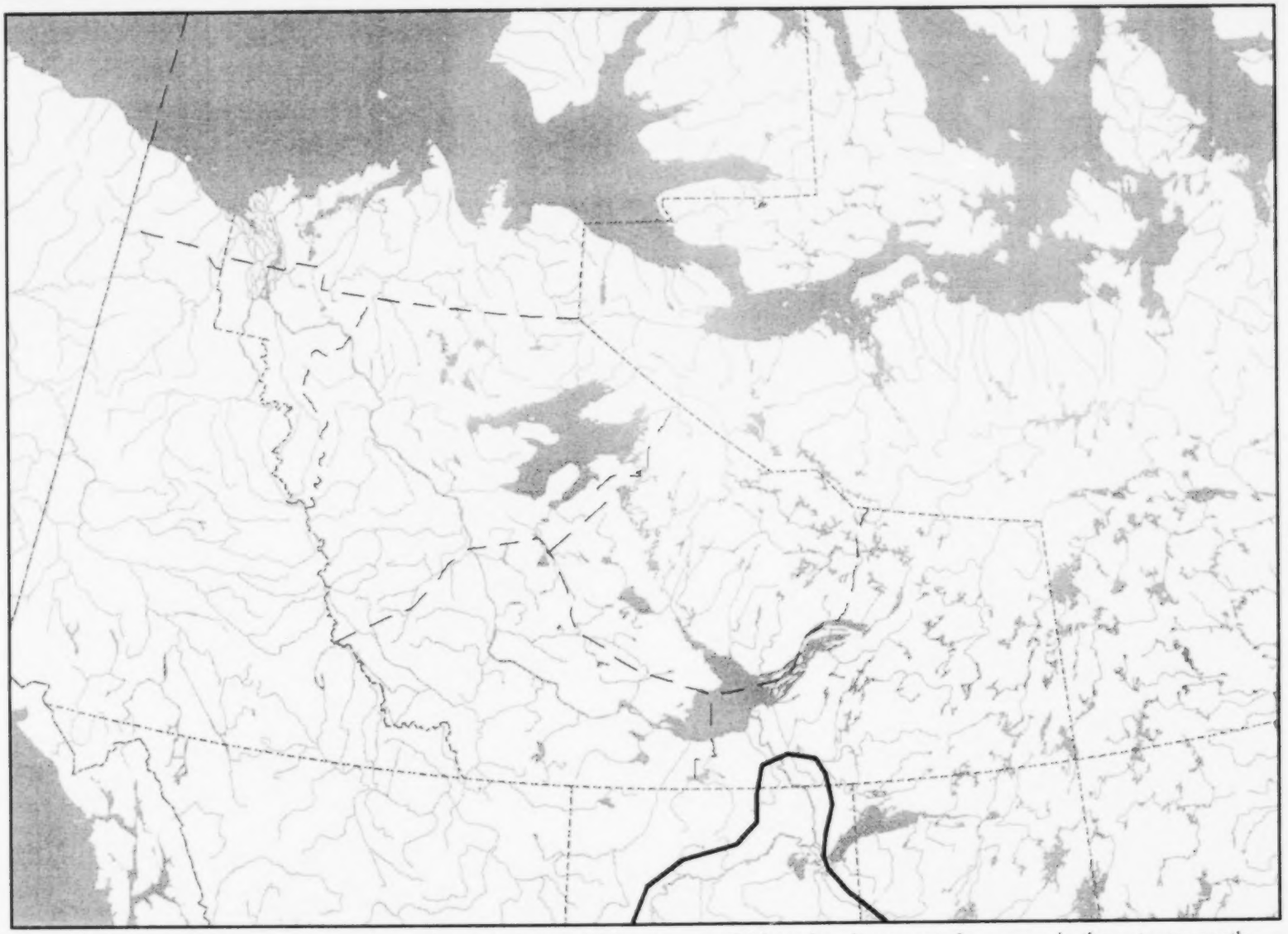

Figure 104. Revised distribution boundaries for Iowa Darter (*Etheostoma exile*) based on its expected presence in the extreme south central area of the NT.

Perca flavescens (Mitchill 1814) [Figs. 105, 106]

Common Names: Yellow Perch (E), perchaude (F).

Conservation Status: Regional: Undetermined (Working Group on General Status of NWT Species 2006).

Habitat: Distributed in the southern area of the NT, the Yellow Perch is primarily lacustrine but also exhibits adfluvial and riverine life history types. Lakes, ponds, and small streams without strong currents are preferred. Spawning occurs between mid-April and August depending on latitude. Generally, spawning takes place in water >2 m deep at night or early morning in association with vegetation, brush, fallen trees, and rocks over a substrate of gravel and sand (Richardson et al. 2001; Evans et al. 2002). Adfluvial perch migrate back to the lake after spawning and riverine adults remain in the river. For the first 3—4 weeks after hatching, riverine fry stay in the upper 0.9—1.2 m of water and select areas with weak currents (Evans et al. 2002). Lacustrine prolarvae remain near the spawning ground for their first 3—4 days and then become pelagic. Young become benthic after 4—5 weeks and most often occur in shallow water (0—5 m) near shore, usually near submerged and emergent vegetation (Richardson et al. 2001). Juveniles and adults occupy similar habitats, but juveniles are usually found in shallower water (0—5 m, as compared to 1—10 m for adults). Adults prefer sand, gravel, cobble, rubble, and mud substrates in areas with moderate vegetation (Richardson et al. 2001; Evans et al. 2002). Yellow Perch are inactive at night, when they can be found resting on the substrate (Evans et al. 2002).

Taxonomic Comments: None.

Distribution Comments: This species does not occur in Alaska, the YT, or NU. The NT distribution area for Yellow Perch was extended west along the Mackenzie River to the Blackwater River (International Game Fish Association 2001). Field work is required to verify this occurrence and distribution in the intervening area southeast to Great Slave Lake.

Notes

Figure 105. Previously published distributions of Yellow Perch (*Perca flavescens*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

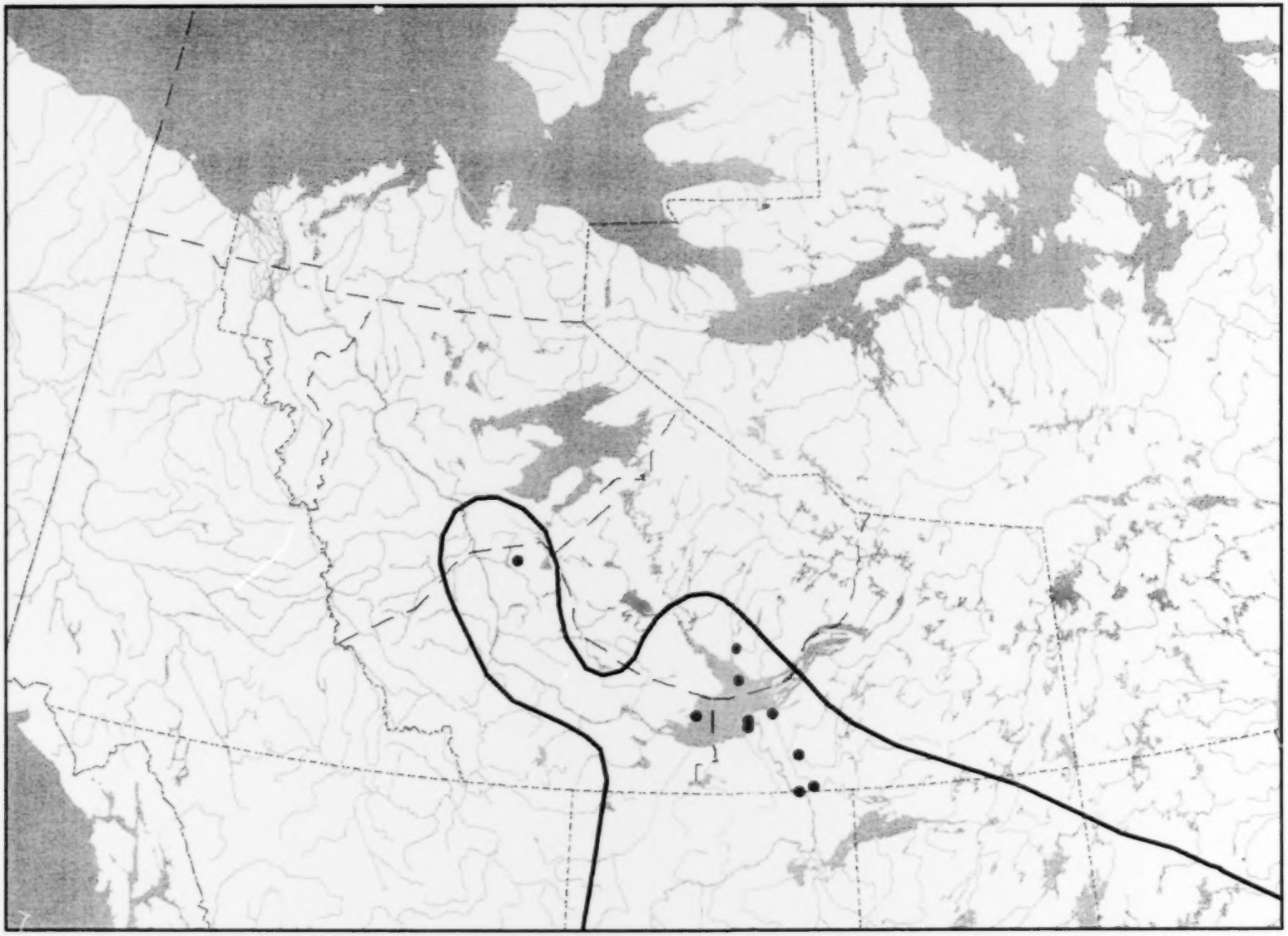

Figure 106. Revised distribution boundaries for Yellow Perch (*Perca flavescens*) based on point distributions and previously published boundaries.

Sander vitreus (Mitchill 1818) [Figs. 107, 108]

Common Names: Walleye (E), doré jaune (F), Ææhch'ñâ, t'á (NS) (Bayha and Snortland 2004), ehch'ęę (DR), ehts'ęę (DR), ehch'ęą (small size) (DR), ehts'ęą (small size) (DR) (Dogrib Divisional Board of Education 1996), pickerel (E, local name) (Dogrib Divisional Board of Education 1996; Bayha and Snortland 2004), dore (E, local name), perch (E, local name) (Bayha and Snortland 2004).

Conservation Status: Regional: Sensitive (Working Group on General Status of NWT Species 2006).

Habitat: Widely distributed in the NT, the Walleye exhibits riverine, adfluvial, and lacustrine life history types. Large, shallow, turbid lakes are preferred but this species also occurs in large, turbid or clear streams and rivers and large clear lakes (Richardson et al. 2001; Evans et al. 2002). Adfluvial and riverine populations spawn in rivers between April and June at water temperatures ranging from 4.5—14°C (Evans et al. 2002). In the NT, lacustrine populations spawn in June or later in tributary streams or within the lake soon after ice out (Richardson et al. 2001). Spawning occurs over substrates of gravel, rocks, or rubble, but may also occur over substrates ranging from large boulders to clay if their preferred substrates are not available. Egg survival is highest over gravel and rubble substrates and lowest over soft mud and detritus (Richardson et al. 2001; Evans et al. 2002).

After hatching, adfluvial fry passively migrate downstream into the adjoining lake, where they remain until they reach maturity and migrate back to the river to spawn. Riverine fry are also carried by flowing water downstream, but once they are strong enough they begin to swim to areas with low flow and no longer move downstream. Fry are typically found at minimal velocities, depths between 0.3—1.5 m, and over a mud, sand, silt, and gravel substrate. Juveniles occupy turbid, dark waters, and use logs and river banks as cover (Evans et al. 2002). Lacustrine fry are generally found in vegetated areas <2 m deep over substrates of gravel, sand, mud, and clay. As they mature they become pelagic and are typically found in the 3—9 m depth range (Richardson et al. 2001).

After spawning, riverine adults either move downstream or into larger tributaries and adfluvial adults return to the main lake. In northern rivers Walleye are typically caught at the mouths of fast flowing rocky streams with low turbidity. Adults prefer water velocities <0.3 m/s, depths >1.22 m, and sand, gravel, mud, cobble, rubble, boulder, clay, silt, and detritus (decreasing order of occurrence) substrates (Evans et al. 2002). In the summer, lacustrine adults seek deeper water during the day and migrate to shallow water at night to feed (Richardson et al. 2001). Adults and juveniles are photonegative and use turbidity, banks, boulders, submerged logs, brush, submerged vegetation, thick ice, and deep and/or dark water for cover (Richardson et al. 2001; Evans et al. 2002).

Taxonomic Comments: The valid scientific name was recently changed from *Stizostedion vitreum* (Nelson et al. 2004).

Distribution Comments: Walleye do not occur in Alaska, the YT, or NU. The occurrence in McLeod Creek (Stewart and Low 2000) is uncertain as the specimen can not be verified.

Notes

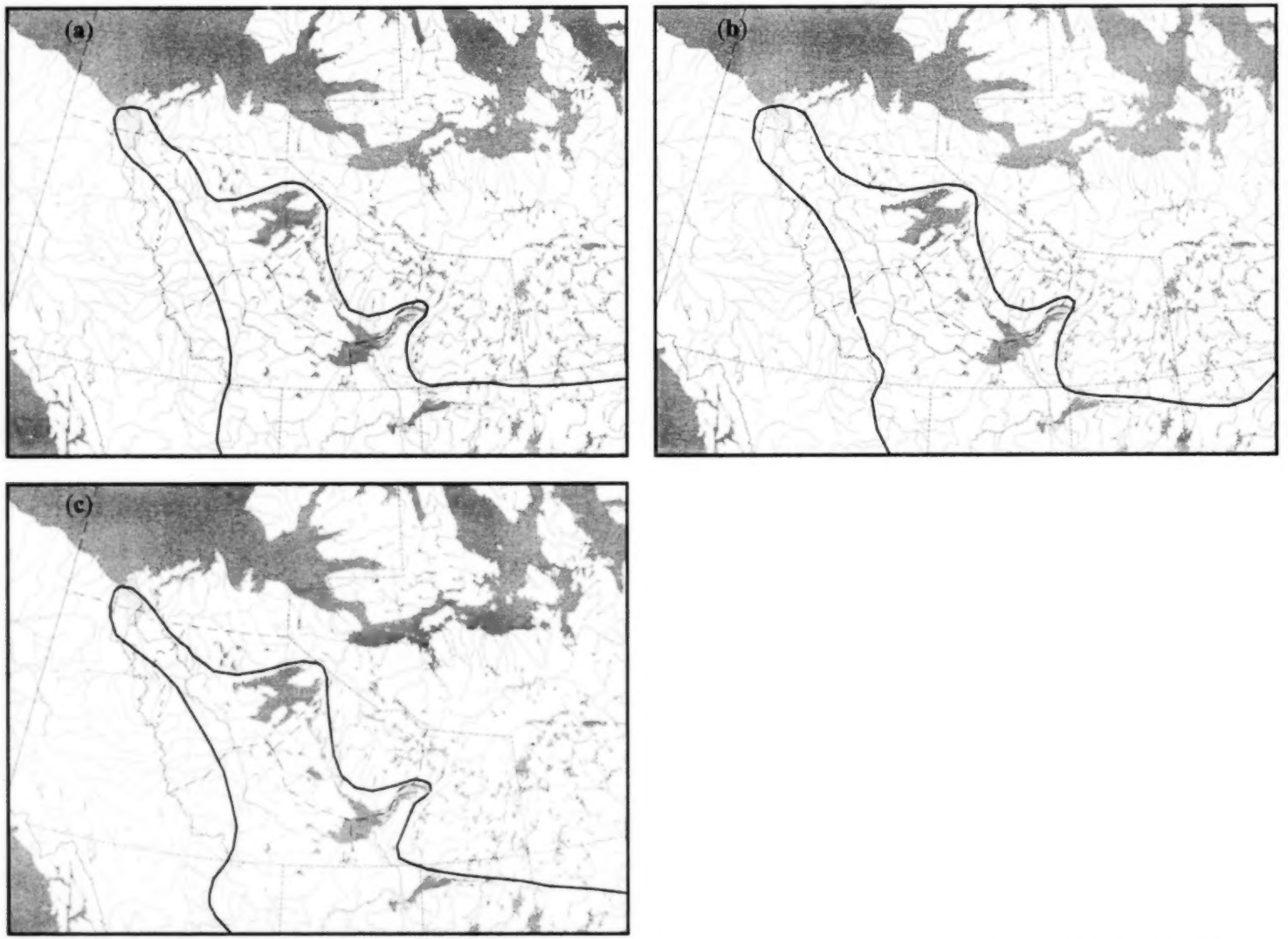

Figure 107. Previously published distributions of Walleye (*Sander vitreus*) modified from (a) McPhail and Lindsey (1970), (b) Lee et al. (1980), and (c) Scott and Crossman (1973).

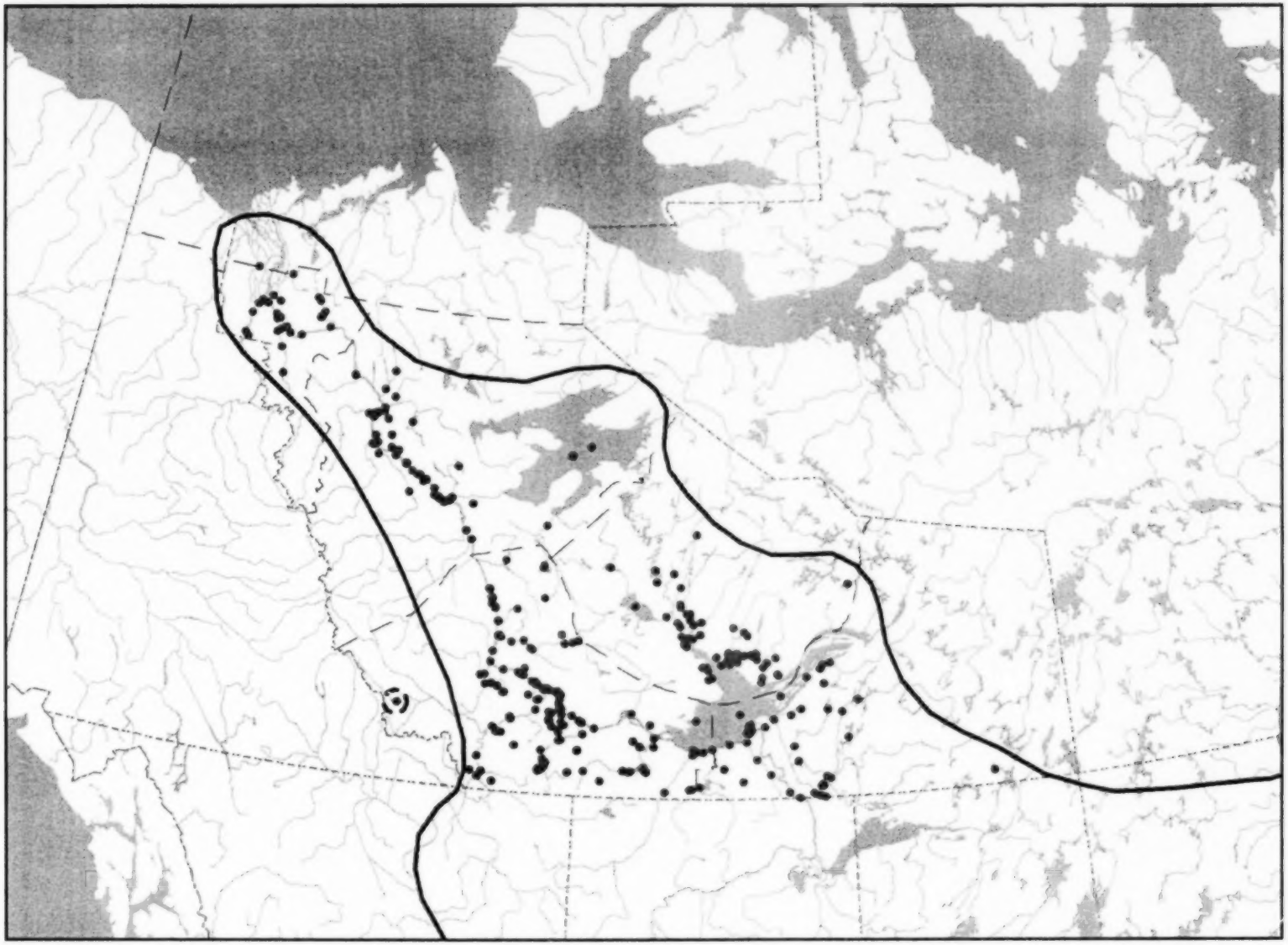

Figure 108. Revised distribution boundaries for Walleye (*Sander vitreus*) based on point distributions and previously published boundaries.

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Table 1. Common and scientific names of freshwater and anadromous species occurring in the Northwest Territories. Bold text provides valid accepted names for recognized taxa; unbolded text indicates names which have been applied in the past to taxa thought to be present in the area. In many cases these represent a taxon in bold type, thus are synonymized with that herein (see text).

Family	Common Name	Scientific Name	Figure Nos.	Page Nos.
Petromyzontidae	American Brook Lamprey	*Lampetra appendix* [1a]	n/a	n/a
	Arctic Lamprey	***Lampetra camtschatica***	3, 4	12, 13
	Darktail Lamprey	*Lampetra alaskensis* [1b]	5, 6	16, 17
Hiodontidae	**Goldeye**	***Hiodon alosoides***	7, 8	20, 21
Cyprinidae	**Lake Chub**	***Couesius plumbeus***	9, 10	24, 25
	Pearl Dace	***Margariscus margarita***	11, 12	28, 29
	Peamouth	***Mylocheilus caurinus***	13, 14	32, 33
	Emerald Shiner	***Notropis atherinoides***	15, 16	36, 37
	Spottail Shiner	***Notropis hudsonius***	17, 18	40, 41
	Northern Redbelly Dace	***Phoxinus eos***	19, 20	44, 45
	Finescale Dace	***Phoxinus neogaeus***	21, 22	48, 49
	Fathead Minnow	***Pimephales promelas***	23, 24	52, 53
	Flathead Chub	***Platygobio gracilis***	25, 26	56, 57
	Longnose Dace	***Rhinichthys cataractae***	27, 28	60, 61
Catostomidae	**Longnose Sucker**	***Catostomus catostomus***	29, 30	64, 65
	White Sucker	***Catostomus commersonii***	31, 32	68, 69
	Largescale Sucker	*Catostomus macrocheilus* [1c]	33, 34	72, 73
Esocidae	**Northern Pike**	***Esox lucius***	35, 36	76, 77
Osmeridae	**Pond Smelt**	***Hypomesus olidus***	37, 38	80, 81
	Rainbow Smelt	***Osmerus mordax***	39, 40	84, 85
Salmonidae	**Cisco**	***Coregonus artedi***	41, 42	88, 89
	Arctic Cisco	***Coregonus autumnalis***	43, 44	92, 93
	Lake Whitefish	***Coregonus clupeaformis***	45, 46	98, 99
	Alaska Whitefish	*Coregonus nelsonii* [2]	47	100
	Humpback Whitefish	*Coregonus pidschian* [2]	48	101
	Broad Whitefish	***Coregonus nasus***	49, 50	104, 105
	Least Cisco	***Coregonus sardinella***	51, 52	108, 109
	Shortjaw Cisco	***Coregonus zenithicus***	53, 54	112, 113
	Pink Salmon	***Oncorhynchus gorbuscha***	55, 56	116, 117
	Chum Salmon	***Oncorhynchus keta***	57, 58	120, 121
	Coho Salmon	***Oncorhynchus kisutch***	59, 60	124, 125
	Rainbow Trout	***Oncorhynchus mykiss*** [3]	61, 62	128, 129
	Sockeye Salmon	***Oncorhynchus nerka***	63, 64	132, 133
	Chinook Salmon	***Oncorhynchus tshawytscha***	65, 66	136, 137
	Pygmy Whitefish	***Prosopium coulterii***	67, 68	140, 141
	Round Whitefish	***Prosopium cylindraceum***	69, 70	144, 145
	Mountain Whitefish	***Prosopium williamsoni***	71, 72	148, 149
	Arctic Char	***Salvelinus alpinus***	73, 74	152, 153
	Bull Trout	***Salvelinus confluentus***	75, 76	156, 157
	Brook Trout	***Salvelinus fontinalis*** [3]	77, 78	160, 161
	Dolly Varden	***Salvelinus malma***	79, 80	164, 165
	Lake Trout	***Salvelinus namaycush***	81, 82	168, 169
	Inconnu	***Stenodus leucichthys***	83, 84	172, 173
	Arctic Grayling	***Thymallus arcticus***	85, 86	176, 177
Percopsidae	**Trout-Perch**	***Percopsis omiscomaycus***	87, 88	180, 181
Gadidae	**Burbot**	***Lota lota***	89, 90	184, 185
Gasterosteidae	**Brook Stickleback**	***Culaea inconstans***	91, 92	188, 189
	Threespine Stickleback	***Gasterosteus aculeatus***	93, 94	192, 193
	Ninespine Stickleback	***Pungitius pungitius***	95, 96	196, 197
Cottidae	**Slimy Sculpin**	***Cottus cognatus***	97, 98	200, 201
	Spoonhead Sculpin	***Cottus ricei***	99, 100	204, 205
	Fourhorn Sculpin	*Myoxocephalus quadricornis* [4]	n/a	n/a
	Deepwater Sculpin	***Myoxocephalus thompsonii***	101, 102	208, 209
Percidae	**Iowa Darter**	***Etheostoma exile***	103, 104	212, 213
	Yellow Perch	***Perca flavescens***	105, 106	216, 217
	Walleye	***Sander vitreus***	107, 108	220, 221

[1] (a) Considered invalid in NT, contrary to Page and Burr (1991); (a & b) likely represent Arctic lamprey (see text); (c) now considered invalid in NT (see species description).
[2] Considered to be subspecies within Lake Whitefish (see text).
[3] Introduced into the NT (see text).
[4] Not included because it is primarily a marine species, although occurrences in coastal freshwaters are frequent (may be isolated in some locations); freshwater form occurs in some lakes on the Arctic islands of the NT.

Table 2. Species occurring in northern drainages of British Columbia, Alberta, and Saskatchewan that are not presently known from the Northwest Territories.

Common Name	Scientific Name	British Columbia	Alberta	Saskatchewan
Blackfin Cisco	*Coregonus nigripinnis*		1[a], 2, 5[b]	
Brassy Minnow	*Hybognathus hankinsoni*	2	1, 5, 7	
Cutthroat Trout	*Oncorhynchus clarkii*	6[c], 7		
Iowa Darter[d]	*Etheostoma exile*		1, 2, 5, 7	
Leopard Dace	*Rhinichthys falcatus*	7		
Northern Pikeminnow	*Ptychocheilus oregonensis*	1, 2, 3, 6, 7	1, 2, 3, 5, 7	
Prickly Sculpin	*Cottus asper*	1, 2, 3, 6, 7	5[e], 7	
Redside Shiner	*Richardsonius balteatus*	1, 2, 3, 6, 7	1, 2, 3, 5, 7	
Splake	*Salvelinus fontinalis x S. namaycush*			4[f]

a - number indicates reference (see literature cited for full citation): 1 - Lee et al. (1980); 2 - Scott and Crossman (1973); 3 - McPhail and Lindsey (1970); 4 - Saskatchewan Parks and Renewable Resources (1991); 5 - Nelson and Paetz (1992); 6 - McPhail and Carveth (1993); 7 - Mandrak (unpubl. 2004).

b - Blackfin Cisco was reported in Lake Athabasca in 1930 by Dymond and Pritchard. Nelson and Paetz (1992) note that verification is lacking and it was most likely a misidentified Cisco, *Coregonus artedi*.

c - introduced into the lower Peace subregion (McPhail and Carveth 1993).

d - there are no records of this species in the Northwest Territories database but their presence is expected (Evans et al. 2002; Richardson et al. 2001).

e - one Prickly Sculpin was caught in the Peace River, 3 km upstream from confluence of Notikewin River by R.L.&L. Environmental Services on June 8, 1989. Nelson and Paetz (1992) note that it may have been carried downstream from B.C., but it is also possible that it is established in the Peace River and its tributaries in Alberta.

f - introduced into Saskatchewan (Saskatchewan Parks and Renewable Resources 1991); successful reproduction has only occurred in hatcheries (Obrey 2002).

Appendix 1

Glossary

Conservation Status Definitions

NWT Species 2006 - 2010

Alien: Species that have been introduced as a result of human activities. Changes in their status can be monitored as their presence and abundance may affect the status of wild species native to the NT (p. 14).

At Risk: Species for which a detailed assessment has already been completed (e.g., by COSEWIC or jurisdictional status reports) that determined the species to be at risk of extirpation or extinction (e.g., Endangered or Threatened according to COSEWIC) (p. 14).

May be at Risk: Species that may be at risk of extinction or extirpation, and are therefore candidates for detailed risk assessment. These species are ranked with the highest priority for a more detailed assessment by COSEWIC or a jurisdiction (p. 14).

Presence Expected: Species not yet recorded in the NT, but that are expected to be present (p. 14).

Secure: Species which are not at risk or sensitive. These species have the lowest priority for further consideration (p. 14).

Sensitive: Species that are not at risk of extinction or extirpation but may require special attention or protection to prevent them from becoming at risk. These species are ranked with a medium priority for further consideration (p. 14).

Undetermined: Species for which insufficient information, knowledge, or data is available to reliably evaluate their general status (p. 14).

Vagrant: Species occurring infrequently and unpredictably in the NT. These species are outside their usual range (p. 14).

Canadian Endangered Species Conservation Council (2000, 2006)

Secure: Species that are not believed to belong in the categories *Extirpated*, *Extinct*, *At Risk*, *May be at Risk*, *Sensitive*, *Accidental*, or *Exotic*. This category includes some species that show a trend of decline in numbers in Canada but remain relatively widespread or abundant (p. 19).

Undetermined: A general status category for which insufficient data, information, or knowledge is available with which to reliably evaluate the status of a species (p. 8).

COSEWIC (2006)

Data Deficient: A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction (p. 1).

Not at Risk: A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances (p. 1).

Threatened: A wildlife species likely to become endangered if limiting factors are not reversed (p. 1).

General Definitions

Alevin: The larval stage of trout and salmon that feeds on its yolk sac and lives under gravel (Mecklenburg et al. 2002).

Ammocoete: The larval stage of lampreys (Mecklenburg et al. 2002).

Benthic: Occurring at the bottom of an ocean, lake or river; or referring to animals that live in or on the bottom (Mecklenburg et al. 2002).

Demersal: Referring to swimming animals that live near the bottom of an ocean, lake or river; also referring to eggs that are denser than water and sink to the bottom after being laid (Mecklenburg et al. 2002).

Diel: Occurring on a daily basis, such as vertical migrations in some copepods and fish (Froese and Pauly 2006).

Hypolimnion: The cold lower layer of a stratified lake, under the epilimnion and beginning just below the thermocline. This layer is not directly affected by surface events (Froese and Pauly 2006).

Limnetic: The open water area of a lake that is off the substrate, shallow enough for light to penetrate and offshore from the littoral zone. The term pelagic is used for the equivalent region in the oceans (Nelson and Paetz 1992).

Littoral: Marine environment or depth zone between the lowest low and the highest high tide lines; general habitats in this area include the littoral pelagic zone and the littoral benthic zone; synonymous with intertidal. In older usage, which is obsolete and not recommended, pertained to the depth zone between the shore and a depth of about 200 m (Mecklenburg et al. 2002).

Lotic: Running water such as creeks, streams and rivers (Nelson and Paetz 1992).

Pelagic: Pertaining to or living in the water column of oceans or lakes (Mecklenburg et al. 2002).

Photonegative: Behavioural avoidance of light.

Phylogeny: Evolutionary relationships and lines of descent in a group of organisms, as opposed to development of an individual organism; or the study of such relationships (Mecklenburg et al. 2002).

Planktonic: Pertaining to small plants and animals that drift with the water currents; includes some fish eggs and larvae (Mecklenburg et al. 2002).

Pool: Stream habitat having smooth surface, slow current and some moderate to deep water; a small, deep confined body of water fed by springs or streams or flushed by the sea such that there is water circulation; or a small pond (Froese and Pauly 2006).

Profundal Zone: The deep region of a body of water, usually below the level of sufficient light penetration for photosynthesis (Nelson and Paetz 1992).

Prolarva: Larva still bearing yolk (Froese and Pauly 2006).

Redd: Excavation or nest made by a spawning salmon (Mecklenburg et al. 2002).

Riffle: Fast-flowing, shallow segment of a stream where the surface of the water is broken over rocks or debris (Froese and Pauly 2006).

Riparian: Pertaining to the river or stream bank; related to, living, or located on the bank of a natural watercourse, usually a river, sometimes a lake or tidewater (Froese and Pauly 2006).

Thermocline: Distinct zone of rapid temperature change between warm water above and cold water below (Mecklenburg et al. 2002).

Ventral: Pertaining to the abdominal or, usually, lower surface of the body or head; in flatfishes the ventral surface in not the lower surface (Mecklenburg et al. 2002).